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DESIGN GUIDE FOR ARMY RESERVE FACILITIES		
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Design Guide for Army Reserve Facilities

DG 1110-3-107



**US Army Corps
of Engineers®**

Office of the Chief of Engineers

Engineering and Construction Directorate

Engineering Division

Washington, D.C. 20314



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Foreword

The Army Reserve is the essential provider for training and support operations to the Army. To prepare for this role, an Army Reserve facility must combine multiple functions into an effective training complex. There are many different types of units in the Army Reserve, and their locales are as diverse as the country itself. Each facility, therefore, presents a unique combination of requirements to the design team. For that reason, there is no standard layout for an Army Reserve center.

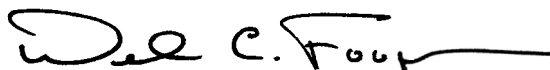
The Army Reserve may be the only military presence in a civilian community. Its image defines the Army to those citizens. For this reason, its facilities must portray the Army Reserve's high standards. It is essential, therefore, to have high quality in both design and construction.

This Design Guide (DG) provides guidance and criteria for the development of high-quality Army Reserve facilities. It applies to planning and design of new, replacement, and major renovation projects. It is effective immediately.

This DG reflects changes and additions to the Army Reserve's design criteria, since it was first published in 1984. The Army Reserve is continuously evaluating its requirements, so this DG is a living document. Users should make recommendations for changes and improvements, with their rationale, to Mr. Joe Gates, U.S. Army Corps of Engineers, Box 59, Louisville, KY. Telephone (502) 315-6849; e-mail - joseph.g.gates@LRL02.usace.army.mil.

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FOR THE CHIEF, ARMY RESERVE

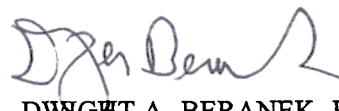


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Table of Contents

DEPARTMENT OF THE ARMY OFFICE OF THE CHIEF OF ENGINEERS Washington, D.C. 20314-1000

DESIGN GUIDE FOR ARMY RESERVE FACILITIES DG 1110-3-107

	Page
Distribution Restriction Page	1
Cover Page	2
Reproduction Authorization/Restrictions	3
Foreword	4
Table of Contents	5
 Chapter 1 Introduction and General Information	
1.1 Purpose of the Design Guide	11
1.2 Scope of the Design Guide	12
1.3 Explanation of Modular Design System (MDS)	13
1.4 Format of the Design Guide	13
1.5 Project Participant Responsibilities	14
1.6 Purpose of the Army Reserve	17
1.7 Quality of Design	17
1.8 Project Delivery	18
1.9 Program Synopsis	19
1.10 AR Project Funding	22
1.11 Construction Contract Award Process	23
 Chapter 2 Planning Guidelines	
2.1 Introduction	24
2.2 Design and Regulatory Criteria and Their Application	25
2.3 Environmental	28
2.4 Site Selection and Planning	28
2.5 Antiterrorism/Force Protection	35
2.6 Landscape	36
2.7 Buildings	38
2.8 Fire Protection/Life Safety	53
2.9 Interior Design	54
2.10 Information Technology	55
2.11 Signage	56
2.12 Accessibility	56
2.13 Security	57
 Chapter 3 General Design Considerations	
3.1 Introduction	58
3.2 Civil and Utilities	58
3.3 Landscape Architecture	71

3.4	Fire Protection/Life Safety	72
3.5	Architectural	74
3.6	Interior Design	79
3.7	Structural	83
3.8	Mechanical	88
3.9	Plumbing	91
3.10	Electrical	91
3.11	Specifications	99
3.12	Cost Estimating	101
3.13	Energy Conservation	102
3.14	Antiterrorism/Force Protection	104
3.15	Accessibility	106
3.16	Environmental	106

Chapter 4 Individual Space Criteria

4.1	General	111
4.2	Training Center Building	112
4.2.1	Full-time Offices	112
4.2.2	Unit Exclusive Offices	113
4.2.3	Unit Common	113
4.2.4	Recruiting/Retention Offices	115
4.2.5	Family Support Office	116
4.2.6	Administrative Support	117
4.2.6.1	Message Center/Mailroom	117
4.2.6.2	Reproduction	118
4.2.6.3	Information Technology	119
4.2.7	Lobby	121
4.2.8	Assembly Hall	122
4.2.9	Chair and Table Storage	124
4.2.10	Kitchen	125
4.2.11	Arms Vault	127
4.2.12	Armorer's Room	130
4.2.13	Classrooms	131
4.2.14	Library Reading Room	134
4.2.15	Library Storage Room	135
4.2.16	Learning Center	136
4.2.17	Training Aids Storage	137
4.2.18	COMSEC Training	137
4.2.19	COMSEC Storage	139
4.2.20	Unit/Individual Storage	140
4.2.21	Staging Area	142
4.2.22	Supply Office	143
4.2.23	Janitorial	144
4.2.24	Flammable Storage	145
4.2.25	Controlled Waste Storage	145
4.2.26	Facility Maintenance Storage	145
4.2.27	Weapons Training	146
4.2.28	Photo Lab	147
4.2.29	Band Room	148
4.2.30	Medical Section	148
4.2.31	Physical Exam Wing	148

4.2.32	Secure Compartmented Information Facility (SCIF)	148
4.2.33	Soils Testing Lab	148
4.2.34	Conference Room	149
4.2.35	Drafting Room	151
4.2.36	Physical Readiness Training	152
4.2.37	AGCCS	153
4.2.38	Distance Learning Center	154
4.2.39	Male and Female Toilets and Showers	155
4.2.40	Accessible Unisex Toilet	156
4.2.41	Male and Female Locker Rooms	156
4.2.42	Vending Alcove	158
4.2.43	Break Area	159
4.2.44	Mechanical	160
4.2.45	Electrical	161
4.2.46	Telephone	162
4.2.47	Circulation	162
4.3	Organizational Maintenance Shop (OMS)	164
4.3.1	Shop Office	164
4.3.2	Unisex Toilet	165
4.3.3	Tools and Parts Storage Room	165
4.3.4	Storage Room	167
4.3.5	Special Equipment Alcove	168
4.3.6	Battery Room	168
4.3.7	Flammable Storage	168
4.3.8	Controlled Waste Storage	169
4.3.9	Workbays	170
4.3.10	Mechanical/Custodial	173
4.3.11	Information Technology	174
4.4	Unheated Storage (UHS)	175
4.5	Area Maintenance Support Activity (AMSA)	176
4.6	Direct Support/General Support (DS/GS)	181
4.7	Deployable Medical Sets (DEPMEDS)	182
4.8	Warehouse	183

List of Figures

1-1	USARC, Fort Dodge, Iowa	11
1-2	Project Guidance	12
1-3	USARC, Camp Parks, California	13
1-4	ARRTC VOQ, Fort McCoy, Wisconsin	15
1-5	Total Systems Design	18
1-6	USARC, Camp Parks, California	19
1-7	OMS/DS-GS, Arden Hills, Minnesota	21
2-1	Project Design Development	24
2-2	USARC, Green Bay, Wisconsin	26
2-3	Site Access	28
2-4	Typical Reserve Center Site Plan	29
2-5	Typical AMSA Site Plan	31
2-6	Typical ECS Site Plan	31
2-7	Landscape Planning	37
2-8	ARRTC VOQ, Fort McCoy, Wisconsin	38

2-9	Flexibility for Future	39
2-10	Training Center Adjacencies	42
2-11	USARC, Green Bay, Wisconsin	42
2-12	Lobby and Full-time Office	43
2-13	Office/Unit Common Relationship	43
2-14	Multiple Unit Commons	44
2-15	USARC, Fort Dodge, Iowa	45
2-16	Assembly Hall Adjacencies	45
2-17	Janitorial and Toilets	47
2-18	Conference Room	49
2-19	OMS Schematic Diagram	50
2-20	Shop Office Views	51
2-21	AMSA Schematic Diagram	52
2-22	Joint OMS/AMSA Schematic Diagram	52
2-23	AMSA Schematic Diagram	53
2-24	ARRTC VOQ, Fort McCoy, Wisconsin	54
2-25	USARC, Camp Parks, California	56
3-1	ARRTC VOQ, Fort McCoy, Wisconsin	58
3-2	ARRTC VOQ, Fort McCoy, Wisconsin	61
3-3	USARC, Camp Parks, California	64
3-4	USARC, Camp Parks, California	67
3-5	USARC, Sacramento, California	71
3-6	AFRC, Greenville, North Carolina	75
3-7	ARRTC VOQ, Fort McCoy, Wisconsin	77
3-8	Dufflebag Cage Layout	79
3-9	USARC, Camp Parks, California	80
3-10	USARC, Arden Hills, Minnesota	87
3-11	Janitor's Closet	91
3-12	USARC, Camp Parks, California	95
3-13	USARC, Arden Hills, Minnesota	103
3-14	USARC, Arden Hills, Minnesota	106
4-1	Single Office	112
4-2	Double Office	112
4-3	Office for 4	113
4-4	Unit Common	114
4-5	Unit Common	114
4-6	Recruiting/Retention Office	115
4-7	Mailroom	117
4-8	Copy Room	118
4-9	NOC	119
4-10	Lobby	121
4-11	Assembly Hall and Kitchen	123
4-12	Chair and Table Storage	124
4-13	Kitchen	125
4-14	Armorer's Room and Arms Vault	127
4-15	Arms Vault Systems	128
4-16	Classroom	132
4-17	Classroom with Operable Partition	132
4-18	Library Reading Room	134
4-19	Library Storage	135
4-20	Learning Center	136

4-21	Training Aids Storage	137
4-22	COMSEC Training and Storage Rooms	138
4-23	Unit Storage with Supply Office	140
4-24	Unit Storage with Staging and Supply Offices	141
4-25	Janitorial	144
4-26	Facility Maintenance Storage	145
4-27	Photo Lab	147
4-28	Conference Room	149
4-29	Physical Readiness Room	152
4-30	AGCCS	153
4-31	Shower Room	155
4-32	Unisex Toilet	156
4-33	Locker Room	157
4-34	Vending Alcove	158
4-35	Break Area	159
4-36	Shop Office	164
4-37	Unisex Toilet	165
4-38	Tools and Parts Storage Room	166
4-39	Flammable Storage	168
4-40	Controlled Waste Storage	169
4-41	Workbays	171
4-42	Small Arms Repair Room with Arms Vault	177
4-43	Electrical/Communications Repair	178
4-44	Break Area	179
4-45	Battery Room and Toilet	180
E-1	Kitchen Equipment Plan	218
G-1	Standard Band Room Plan	222
I-1	Typical Medical Section Plan	226
J-1	Typical ECS Layout	229

Appendices for other buildings or subjects

Appendix A	Acronyms and Military Rank	184
Appendix B	OMAR-Funded Items	188
Appendix C	Design Criteria and Guidance	190
Appendix D	Sample 1390, 1391, and 5034R - Functional Space Details Forms	196
Appendix E	Kitchen Plan and Equipment List	218
Appendix F	Toilet Room Fixture Counts	220
Appendix G	Band Room	222
Appendix H	Secure Compartmented Information Facilities (SCIF)	224
Appendix I	Physical Exam Wing	226
Appendix J	Equipment Concentration Site (ECS)	229
Appendix K	Nonstructural Standing Seam Metal Roof System for Army Reserve Projects	231
Appendix L	Sample Projects and Photographic Credits	234

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Chapter 1

Introduction and General Information

1.1

Purpose of the Design Guide

1.1.1 This Design Guide contains design criteria and general requirements to be used in the development of designs for new construction and additions/alterations of U. S. Army Reserve (AR) facilities. Its purpose is to serve as one means for the Using Service to convey functional and other criteria for Military Construction Army Reserve (MCAR) projects to the Design Agency charged with the planning and design of a facility. This Guide is also intended to aid in the formulation of project documentation for inclusion in military construction programs.

1.1.1.1 The Using Service is the Office of the Chief, Army Reserve (OCAR). An OCAR representative, the Project Officer, is typically assigned to each project.

1.1.1.2 The AR Installation includes the AR unit(s) that will utilize the facility (Tenants) and the AR Regional Support Command (RSC), which supports the unit(s).

1.1.1.3 The Design Agency is the Corps of Engineers (COE) or other engineering command, which acts as AR's agent for obtaining design and construction services. The Design Agency may develop project designs utilizing their in-house design personnel, or may contract with private-sector architecture and engineering firms (A/Es) to provide design services. The in-house personnel or private-sector A/E team will be referred to as "designer" or "design team" in this Guide.



Figure 1-1
USARC, Ft. Dodge,
Iowa

1.1.2 This Guide should also be used as a benchmark of acceptable quality for AR Full Facility Revitalization (FFR), Real Property Exchange (RPX), Minor Maintenance and Repair (MMR) and other projects. See Paragraph 1.10 below for additional information on such programs and their funding.

1.1.3 This Guide should be considered to provide guidance representing an 80% solution; the information should apply at least 80% of the time, and address at least 80% of the issues. The Design Agency should always obtain Using Service approval when departing from the guidance herein.

1.2 Scope of the Design Guide

1.2.1 This Guide is applicable to all new construction projects for Army Reserve facilities, and as a general guide in the modernization or revitalization of existing facilities. Only the more common or typical features associated with Army Reserve facilities are addressed. The Guide deals primarily with training center buildings and vehicle maintenance shops, both of which directly support a training facility or group of facilities.

1.2.2 The intent of the Guide is to provide a portion of the general information and guidance required for the successful preparation of project designs. Additional information and guidance must be obtained from the Using Service, the AR Installation, the Design Agency, and designer investigations on such matters as project scope, local codes and site constraints. Typical project-specific and general documentation to be made available to the designers is listed below. Additional listings of criteria are in Appendix C.

1.2.2.1 Project Documents

DD Forms 1390 and 1391 – project authorization documentation.

DD Form 5034R – Functional Space Worksheet (with notes).

Project Scope of Work for design team.

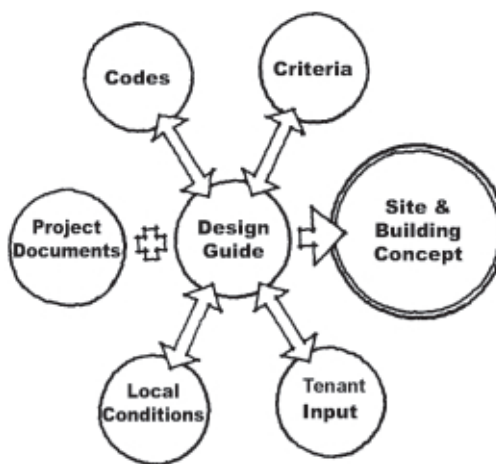


Figure 1-2 Project Guidance

1.2.2.2 Additional Design Criteria

USAR Design Process and Submittal Requirements.

Design Criteria, Technical Manuals, Technical Letters and other design guidance.

Unified Facility Guide Specifications (UFGS).

1.3 Explanation of the Modular Design System (MDS)



Figure 1-3
USARC, Camp
Parks, California

1.3.1 The Modular Design System (MDS) is a unique Microstation-based computer-aided design software program used to complete AR facility designs. This program contains the level of quality expected by the Army Reserve. MDS has the unique capability to streamline the design and review process, offer more uniform construction quality and produce a reliable cost estimate early in the design process. The cost estimate is automatically derived from floor plans developed through use of the software. MDS is a step-by-step, forward progressing software. It relies a great deal on good sound decisions being made early in the design process. Using reliable input, MDS will produce a great deal of design information in a short time frame. This information is produced in a logical and sequential manner that is unique to MDS. Therefore, the submittal requirements are based on the MDS methodology in terms of what information is submitted at each design phase.

1.3.2 MDS is a kit-of-parts-type software program, and contains a wide variety of predesigned space modules for AR facilities, as well as information on AR-approved systems, materials, and standards of quality. The MDS software incorporates the Military Computer-Aided Cost Estimating System (M-CACES), and is used with the Unified Facility Guide Specifications to produce finished design documents and cost estimates. Many, but not all, AR projects are designed utilizing MDS. This Guide is intended to support the design of AR projects, whether using MDS or not, but does not incorporate all information contained in MDS. Designers of projects not utilizing MDS may wish to request MDS documents to utilize as references for certain portions of their projects, such as kitchens.

1.3.3 Along with MDS, AR developed its “USAR Design Process and Submittal Requirements” document to define its desired design process and the submittals to be made at each step of the process. All AR projects should follow the process and submittal requirements, unless otherwise directed by the Using Service or the Design Agency.

1.4 Format of the Design Guide

1.4.1 The Design Guide format is intended to facilitate the development of project requirements and designs by dealing with major criteria on both a general and specific level.

1.4.2 Chapter 1 provides general information about the Army Reserve, and its facilities program and process. Chapter 2 provides information and guidance on overall planning of Army Reserve sites and buildings, with emphasis on site and building organization, functionality, adjacencies and esthetics. Chapter 3 contains information and guidance on systems and materials applicable to all Army Reserve facilities, site design, and the design

of the various buildings – large-scale, total building or facility issues. Chapter 4 contains specific requirements for the design of each type of typical space in an Army Reserve facility. Additional information is included in the Appendices.

1.4.3 Illustrations in this Guide represent possible applications of the criteria and are not intended to be definitive. The Design Agency is encouraged to be creative throughout the design process. Local conditions, codes and specific project requirements are major design considerations in the development of a total, integrated facility.

1.5 Project Participant Responsibilities

1.5.1 The Using Service (OCAR) is responsible for the following:

1.5.1.1 Determining functional requirements from AR criteria.

1.5.1.2 Approving functional requirements or Tenant requests that extend beyond the scope of this Guide.

1.5.1.3 Preparing and submitting project documentation (DD Forms 1390 and 1391 and supporting data) in accordance with Army Regulation (AR) 140-483, and providing any updates of these documents as the project progresses.

1.5.1.4 Approving concept and later designs to certify compliance with functional requirements.

1.5.1.5 Developing additional information, as required, such as telephone needs, special electrical requirements and equipment specifications.

1.5.2 The Design Agency is responsible for the following:

1.5.2.1 Preparing a design that provides for a complete and usable facility, including all equipment, fixtures and furnishings except those specifically designated as Government-furnished.

1.5.2.2 Incorporating the functional requirements of the Using Service and AR Installation into the project design.

1.5.2.3 Developing a design responsive to the criteria in this Guide and the project documentation, and preparing all submittals required by the USAR Design Process and Submittal Requirements, and the project Scope of Work.

1.5.2.4 Justifying, in the project Design Analysis, any issues of design which do not follow this Guide and other project documentation.

1.5.2.5 Incorporating the quality standards for the overall design as described in this Guide and other criteria for the project.

1.5.2.6 Identifying the applicable codes and regulations, and ensuring that the design is in compliance with them.

1.5.2.7 Preparing cost estimates, and ensuring that the design will provide a fully functional facility within the project construction cost limit (CCL). Optional bid items may be required to ensure that a base bid within the construction cost limit can be achieved. Any such options must be planned such that the facility is complete and usable without their inclusion.

1.5.2.8 Preparing a draft of DD Form 1354, Transfer and Acceptance of Military Real Property.



Figure 1-4
ARRTC VOQ,
Ft. McCoy,
Wisconsin

1.5.2.9 Preparing any surveys and/or geotechnical, environmental, sustainable design or other investigations identified in the project Scope of Work.

1.5.2.10 Developing design analyses, calculations, and other information that supports and explains the project design.

1.5.2.11 Identifying issues that will deserve special attention during project construction.

1.5.2.12 Preparing a draft of specification Section 00800 for the use of the constructing entity, and reviewing and commenting on the remainder of the “front-end” specifications.

1.5.2.13 Complete coordination of A/E discipline interfaces, and checking for architectural, structural, HVAC, electrical, plumbing and fire protection conflicts.

1.5.2.14 Preparing a submittal register for inclusion in the specifications, coordinated with the construction entity.

1.5.3 The AR Support Installation is responsible for the following:

1.5.3.1 Providing the Design Agency with as-built drawings of existing construction.

1.5.3.2 For alteration projects, providing a copy of all outstanding maintenance and repair work orders.

1.5.3.3 Providing a copy of the current 416th Engineering Command Full Facility Assessment.

1.5.3.4 Providing a condition survey for any existing facilities affected by the proposed work, along with a list of any red or amber conditions noted in the Installation Status Report.

1.5.3.5 Reviewing and commenting on Design Agency submittals, and providing input to the Design Agency as requested.

1.5.3.6 Ensuring that any required real estate purchase is accomplished in a timely manner.

1.5.3.7 Providing a threat assessment that identifies the level of risk for the facility to be designed.

1.5.3.8 If real estate was purchased for the project, providing a copy of the Real Estate Planning Report (REPR) and any Engineering Feasibility Study done during the real estate acquisition.

1.5.3.9 Performing any required environmental investigations, and preparing any required environmental documentation, such as environmental baseline surveys (EBS) and/or environmental assessments (EA). The AR Installation may contract with the Design Agency or design team for performance of these tasks.

1.6 Purpose of the Army Reserve

1.6.1 The purpose of the Army Reserve is to provide trained units and qualified individual soldiers for active duty in time of need.

1.6.2 The Army Reserve spends most of its drill time in training. Therefore, a Reserve Center is a training center.

1.6.2.1 The individual soldier is given hands-on training in the skills of his/her job with particular emphasis on the operation and maintenance of equipment.

1.6.2.2 Unit training is accomplished by progressively larger and larger elements to perform the mission as a team.

1.6.3 Every functional space in a Reserve Center is intended to be primarily a training space. For example:

1.6.3.1 The primary purpose of a kitchen is to allow cooks to train. The secondary purpose is to feed the troops.

1.6.3.2 The primary purpose of the organizational maintenance shop (OMS) is to allow the training of mechanics. The secondary purpose is to maintain vehicles.

1.6.3.3 The primary purpose of office space is to allow the training of staff and clerical personnel. The secondary purpose is to perform administrative functions associated with the unit's mission.

1.6.4 A Reserve Center is an institutional building with both community and national significance. The center is the home station for the local unit composed of individuals sharing experiences of personal action on behalf of the community, much in the same way as a volunteer fire department. At the same time, as a Government installation of the U. S. Army, it represents the entire Army. Thus the design of the building must reflect the Reservists' feelings of patriotism, pride and community participation as well as a sense of the purpose of the U. S. Army: to keep the peace by maintaining a strong and capable organized military force.

1.7 Quality of Design

1.7.1 The Design Agency must seek design excellence through commitment to high standards. Success in achieving this objective lies not in the repetition of previous design solutions but in relating to the Using Service and AR Installation project-specific requirements, and responding to their unique needs.

1.7.2 The concept of total systems design will be emphasized in promoting the development of a functional, energy efficient and esthetically pleasing building. Design concepts must evolve in a multidisciplinary manner with regard to architectural, civil, structural, electrical and mechanical systems.

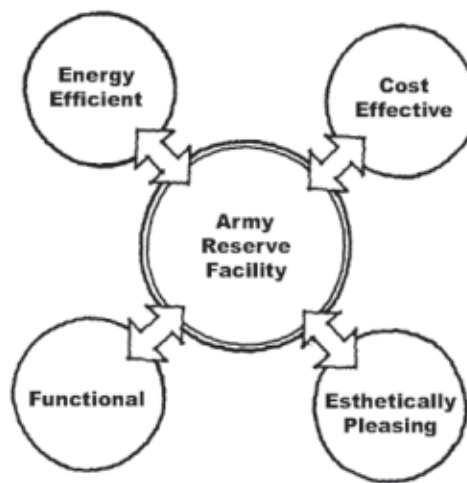


Figure 1-5 Total Systems Design

1.7.3 In evaluating the cost impact of design decisions, the designer will consider the life cycle cost effectiveness, not just the initial cost.

1.8 Project Delivery

1.8.1 Design/Bid/Build Delivery Process: The majority of AR facility projects are delivered through the design/bid/build (D/B/B) process. The Design Agency prepares a comprehensive and detailed set of construction documents; interested construction contractors use these documents to prepare competitive “hard” bids for Government evaluation; and the qualified bidder with the lowest proposed construction price is awarded the contract for construction at the proposed price.

1.8.1.2 Under the D/B/B delivery method it is critical that the Design Agency provides construction documents that clearly define all construction requirements, so that the Using Service gets the benefit of best possible bids. No issues should remain vague or be left in a state to be resolved during construction; this could result in differing assumptions among bidders, bid protests and contractor claims for price increases during construction.

1.8.1.3 The designer must also keep in mind that bidders are not required to visit the construction site prior to bidding. The construction documents must allow for preparation of bids without the necessity of a site visit. Any items identified as options to the base bid must likewise be fully defined. Both the base bid condition and the option condition must be adequately illustrated, detailed and specified.

1.8.2 Design/Build Delivery Process: Some AR projects may be delivered through a design/build (D/B) process. Under this delivery method the Design Agency develops a D/B Request for Proposal (RFP) solicitation package. Interested D/B teams respond with statements of qualifications as well as their proposed construction price. The proposals are evaluated on price, qualifications, and other items or information requested in the RFP. The highest-ranked proposing team is awarded a contract to complete the project design and perform the construction.

1.8.2.1 The Using Service, the AR Installation, and the Design Agency must determine the scope and content of the D/B RFP. The goal is to provide sufficient project information and criteria to ensure that the resulting facility will meet standard AR requirements for quality, functionality, performance and esthetics. The facility program and AR standards must be defined, and specific Tenant requirements identified. Qualifications for selection must be described, along with design completion requirements and submittals.

1.8.2.2 The D/B RFP may include conceptual site and building plans, conceptual image sketches, and outline specifications.

1.9 Program Synopsis

1.9.1 A typical facility consists of two major components: the training center and related maintenance facilities.

1.9.2 Chapter 4 delineates the functional and environmental requirements for most individual spaces within the training center and maintenance buildings. Not all projects will include all of the spaces, nor are all of the possible types of spaces included in this Design Guide. Specific information on the types and sizes of spaces authorized is determined by the project documentation. The Design Agency will supplement the information in this Guide in the project documentation and at the initial design conference.



**Figure 1-6
USARC, Camp
Parks, California**

1.9.3 The Army Reserve Center or training center (TC) generally consists of five main functional groups: administrative, assembly/kitchen, weapons, educational, and storage. Supporting these main functional groups are the special training and support areas. Within each group are subordinate functional areas that contribute to the operation of the group. Circulation and structural space are allocated to each project based on the size of the other authorized spaces.

1.9.3.1 The administrative group consists of spaces for offices, recruiting/retention, information technology, administrative support, and a lobby:

1.9.3.1.1 Full-time and unit exclusive office space is dedicated space for full-time employees and unit supervisors. These may be single or shared offices.

1.9.3.1.2 Unit common office space is shared space for use by nonsupervisory unit personnel. The unit common workstations are available for use by the various Tenant units on their assigned drill weekends.

1.9.3.1.3 Supporting spaces include such functions as the mailroom, administrative support rooms, information technology, recruiting/retention offices, family support office, and the lobby.

1.9.3.2 The assembly/kitchen group consists of the assembly hall, table and chair storage, and the kitchen.

1.9.3.2.1 The main element of the assembly group is a multipurpose space for assembly. The hall serves as a large classroom, a practical training area, a dining room, and as an area for drills and ceremonies.

1.9.3.2.2 The kitchen serves as a training space for cooks, and is also used to prepare and serve meals for drills and other events.

1.9.3.3 The weapons group consists of the arms vault, for storage of the Tenants' weapons, and the armorer's room, for weapon distribution/return and repair.

1.9.3.4 The educational group consists of classrooms, library reading and storage rooms, learning center, training aids storage, and communications security (COMSEC) training and storage rooms. These areas provide instructional space for Reservists during weekend training periods and testing areas for potential unit members.

1.9.3.5 The storage group consists of unit/individual storage areas, staging area, supply offices, and storage spaces for janitorial, facility maintenance, flammables and controlled waste. The unit/individual storage space is closely related to the assembly group, which provides a training space for use of the equipment issued from the storage group.

1.9.3.6 Special training areas, when authorized, include such spaces as physical training, weapons training, drafting rooms, medical wings,

band areas and photo labs. General-use conference rooms, when authorized, are included as special training spaces.

1.9.3.7 Support areas are allocated in proportion to the number of soldiers, or the size of the other authorized spaces in the facility. They include toilets, showers, locker rooms, vending, breakroom, and space for mechanical, electrical, and telephone equipment.

1.9.3.8 A privately-owned vehicle parking area (POV) is typically associated with the training center.



Figure 1-7
OMS/DS-GS, Arden
Hills, Minnesota

1.9.4 Maintenance facilities consist of organizational maintenance shops (OMS), direct support and general support maintenance shops (DS/GS), area maintenance support activity shops (AMSA), and maintenance shops of equipment concentration sites (ECS).

1.9.4.1 These facilities may be collocated with a training center and with each other. When collocated, the maintenance workbays will be shared. Military equipment parking areas (MEP) are also associated with these facilities.

1.9.4.2 OMS and DS/GS Shops are used primarily to train Reserve mechanics, although some full-time employees may be assigned to these facilities.

1.9.4.3 AMSA and ECS maintenance facilities have the same requirements and will both be referred to as AMSA. These shops are used primarily to service vehicles, using a full-time staff. The bulk of maintenance work is performed in these shops.

1.9.4.4 An ECS is a large storage site with outdoor parking areas and enclosed warehousing of military equipment, typically located at a larger Government installation. The ECS is designed not only to store equipment but also to efficiently issue and return equipment used in training exercises. Facilities which may be associated with an ECS, if included in the project documentation, are an MEP, fuel dispensing system, loading ramp, wash platform, indoor equipment storage warehouse, combat vehicle arms vault, fencing, security lighting and an AMSA.

1.9.4.5 Common OMS/AMSA/ECS Configurations

1.9.4.5.1 As a separate location, supporting AR units in a geographical area, a typical AMSA will consist of an AMSA building with POV area and MEP.

1.9.4.5.2 When collocated with an OMS, and supporting USAR units in a geographical area, there will typically be an OMS/AMSA building with shared workbays, a shared POV area, and an MEP.

1.9.4.5.3 If in a separate location, and supporting only an ECS, there will typically be an AMSA building, POV area, MEP, and any other ancillary facilities as provided for in the project documents.

1.10 AR Project Funding

1.10.1 The Government generally utilizes two sources of funding for new and add/alter AR projects: MCAR, and Operation and Maintenance Army Reserve (OMAR) funds. The construction documents must identify all OMAR-funded items so that the bidders can provide separate pricing. Cost estimates must also differentiate the two types of funds, and OMAR items must be further divided into furniture and collateral equipment. A list of OMAR-funded collateral equipment is in Appendix B.

1.10.1.1 All fixed site and building construction is typically MCAR-funded. Unless otherwise directed, all required built-in equipment and furnishings are also MCAR-funded and will be included in the design of the project, to be furnished and installed by the construction contractor.

1.10.1.2 Moveable equipment (items not built into the construction or hard-connected to utilities, and which could be relocated to another facility for reuse) and some specialty items are OMAR-funded. They will also be included in the design, to be furnished and installed by the construction contractor. Finally, furnishings and some specialty equipment are OMAR-funded, and will be included for information only in the design documents, but will typically be furnished by the Using Service under a separate contract. The Design Agency will prepare a separate package for furniture acquisition.

1.10.2 The Full Facility Revitalization (FFR), Minor Maintenance and Repair (MMR), and other programs are also OMAR-funded. These programs generally use simplified design methods to design and construct projects within annual OMAR funding cycles; utilize the Design Guide and the standards embodied in MDS as the starting point for project designs.

1.10.2.1 In the FFR program, all building components in the affected buildings, and the utility infrastructure, are evaluated for remaining useful life, and for compliance with current building and life safety codes. Systems and components that are at or near failure, or in

serious need of modernization, are replaced with current products approved by the Using Service.

1.10.2.2 FFR projects are further evaluated against Plant Replacement Value (PRV), as defined by Army Regulation (AR) 420-10, and cannot exceed 50% of PRV without specific approval of the appropriate Deputy Assistant Secretary of the Army.

1.10.2.3 The majority of FFR projects consist of maintenance and repair (M&R), or health/life safety work. These projects are funded from different subsets of the OMAR “K” account.

1.10.2.4 FFR projects may include some incidental new Minor Construction work in order to provide complete and usable USAR facilities. This work is funded from the OMAR “L” account; the current limits on the allowable construction cost must be verified and not exceeded.

1.10.2.5 Cost estimates for FFR projects must differentiate the amounts to be funded from different OMAR accounts, as directed by the Using Service.

1.10.3 Real Property Exchange projects involve the exchange of Army Reserve property and/or facilities for property or facilities owned or built-to-suit by other Governmental units or the private sector. The entity with which the AR makes such an exchange is the “exchange partner.” The exchange partner typically provides the funding for any facility design and construction to be acquired by the AR in such exchanges, and often provides both the design and construction of the facility, transferring ownership to the AR when the project is ready for occupancy.

1.11

Construction Contract Award Process

1.11.1 The construction contracts for many of the AR projects are awarded solely on the basis of lowest bid, after an open, competitive bidding process. Other contracts may be awarded on the basis of price among other qualifications, and some contracts may be set-aside for award to small or small, disadvantaged businesses, on the basis of price, or price among other qualifications.

1.11.2 The construction documents must be complete and comprehensive to ensure, to the extent possible, that all work required is shown or described. No details or other parts of the work should be left for resolution during construction. This will help ensure that all prospective construction contractors are basing their bids or proposals on the same construction work effort.

Chapter 2

Planning Guidelines

2.1

Introduction

2.1.1 The goal of the site and building planning process is to develop one or more site/building concepts for a functional and efficient facility. In addition to meeting AR criteria and standards, the facility should fit well into the surrounding environment, and accommodate existing and future development to the extent possible.

2.1.2 A wide variety of factors must be considered in the site and building planning process; this Chapter identifies and discusses some of them. The Design Agency must ensure that all appropriate factors are considered, including those that are specific to the project site.

2.1.3 The two main documents submitted to the designer, prior to beginning design for a facility, are the project documents (see 1.2.2.1) and this Guide. The project documents lists the authorized spaces and their respective areas for a specific project. This Guide provides design criteria and application guidelines which will be used in the development of the project. Use of these two documents will help the designer to quickly produce the schematic design and design development of the proposed facility.

2.2.1 The Design Agency must become familiar with the following design and regulatory criteria and apply them to the planning, and later the design, process. It is important that applicable criteria be identified early in the planning process to avoid revisions being required at a later point. In cases where criteria are in conflict, the more stringent criteria generally applies; questions concerning conflicting criteria should be presented to the Using Service for resolution.

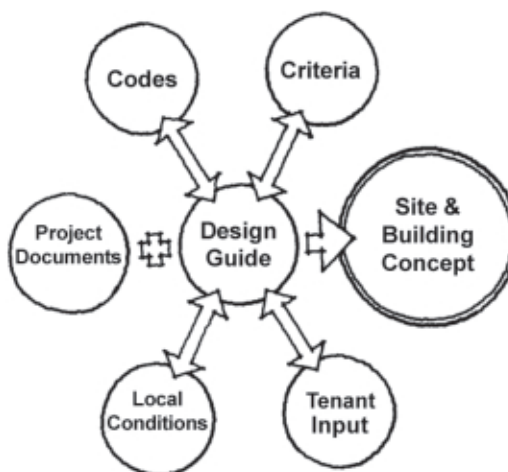


Figure 2-1 Project Design Development

2.2 Design and Regulatory Criteria and Their Application

2.2.1.1 AR Standards and Criteria

Project Documents

This Design Guide

Modular Design Systems (see Chapter 3 for discussion of standard MDS materials and systems)

USAR Design Process and Submittal Requirements

2.2.1.2 Army Technical Manuals and Other Criteria

See Appendix C for listing

2.2.1.3 Local Codes, Regulations and Utility Requirements

2.2.1.3.1 The Using Service has identified the 2000 Uniform Building Code, the current edition of NFPA 101 (Life Safety Code), the National Standard Plumbing Code, NEC, and Military Handbook (MIL HDBK) 1008C as its primary building codes. NFPA 101 governs all exiting issues; MIL HDBK 1008C governs fire protection issues, and includes by reference the National Fire Codes and other specific NFPA criteria, such as NFPA 88B - Repair Garages (for maintenance shops). These typically would take precedence over local code requirements unless local code requirements are more stringent. (DoD may adopt the International Building Code (IBC) soon after publication of this Guide; designers should verify appropriate primary building code. If IBC is adopted, refer to UFC 1-300-02, "Military Use of Model Building Codes.")

2.2.1.3.2 The Design Agency must identify local (state, county, city, etc.) codes, regulations, and utility requirements which would be applicable to a typical building project at the site, and determine their applicability to the AR project.

2.2.1.3.2.1 If the project site is owned by the Federal Government, it may be a "Federal reservation," and compliance with all local codes and regulations is not necessarily required. However, AR strives to be a "good neighbor" in the communities of its citizen soldiers, and prefers to comply with local codes and regulations, unless such compliance would be particularly onerous or costly. Using Service encourages the Design Agency to meet with local code and regulatory officials to review the project and the local requirements, and to present any recommendations for non-compliance with local

regulations to the Using Service for resolution.

2.2.1.3.2.2 Property owned by the Federal Government may also be under concurrent jurisdiction of the local and Federal Government, by agreement. If so, compliance with local codes and regulations is generally required. However, the Using Service still encourages the Design Agency to meet with local code and regulatory officials to review the project and the local requirements, and to present any recommendations for noncompliance with local regulations to the Using Service for resolution.

2.2.1.3.3 In general, on a Federal reservation, the local building and zoning codes do not apply; no building permit will be required, nor will construction inspections be performed by local building officials. Local fire codes and utility requirements generally do apply, since these organizations will be the likely service providers to the facility. Other local requirements also generally apply, such as those governing environmental, drainage, traffic, and similar issues.



Figure 2.2
USARC, Green Bay,
Wisconsin

2.2.1.3.4 The Design Agency must identify any submittal or permitting requirements, and address them. This can be achieved either by the Design Agency making required submittals and applications, or by incorporating the requirement into the construction documents for contractor implementation. If application and permitting responsibilities are assigned to the construction contractor, the Design Agency must obtain and fill out applications as completely as possible, and convey them to the COE construction district for contractor use and completion. The Design Agency must also identify any fees the contractor will be required to pay, and include them in the cost estimate and construction documents.

2.2.1.3.5 On a nonFederal-reservation AR facility, such as a leased facility, local codes and regulations apply as they would for any private-sector project, and building permits and inspections will be required.

2.2.1.4 Installation Design Guidance

2.2.1.4.1 If the AR project site is on a larger Government installation, it is likely that the property owner will have installation design guidance applicable to the project, such as an Installation Design Guide. The Design Agency must identify any

such guidance, and work with the Using Service to determine its applicability.

2.2.1.4.2 On a larger Government installation, there typically will also be a public works or similar department, which is likely to have its own requirements for construction on the installation. This department may also control some or all of the utility services. The Design Agency should coordinate its design with the appropriate department personnel.

2.2.1.5 Corps of Engineers Design Guidance

2.2.1.5.1 The Corps of Engineers design or construction District may have design guidance, such Architect/Engineering Instructions, District Design Guides, or construction details that may be applicable. The Design Agency and the Using Service must determine their applicability.

2.2.2 Units of Measure

2.2.2.1 By Federal Government mandate, all AR construction projects are to be designed and constructed using “hard” metric units of measure, with very limited exceptions. Simple conversion of inch-pound (I-P) or English units of measure (“soft” metric) is not an acceptable method of meeting this requirement.

2.2.2.2 All AR new construction projects must be in metric units unless appreciable cost savings or construction difficulties can be demonstrated for use of I-P units. The COE geographic District will determine if a waiver of the metric requirement is justified for individual projects. Additions and alterations to existing construction may utilize I-P units, if the existing facility utilized I-P units, to match the existing construction and avoid the necessity of maintaining a facility with two systems of measure.

2.2.2.3 When using metric units, the final construction documents must show metric units only on drawings, but may show metric units, followed by I-P units in parentheses, in the specifications. Preliminary (charette) drawings and specifications may show metric units followed by I-P in parentheses for ease of review, if so directed by the Using Service. Supporting design calculations, which do not become part of the construction documents, may be in I-P for the convenience of the designers and reviewers. Surveys, geotechnical reports, and other similar documents to be provided to the contractor must be in metric units. DD Form 1354 will always be prepared in I-P units; this

record-keeping has not been converted to metric.

2.2.3 Sustainable Design: New AR projects have a goal to qualify for at least the bronze rating of under the criteria of Engineering Technical Letter (ETL) 1110-3-491, “Sustainable Design for Military Facilities”. The designer may want to consider passive solar designs, use of daylighting, increased wall and roof insulation, internal thermal mass and earth berms in the development of the architectural design. Many of the measures recommended for consideration in the ETL are fairly standard design practice, or can be achieved with little cost or schedule impact. The ETL provides a methodology for consideration of potential sustainable design measures.

2.3 Environmental

2.3.1 In general, an Environmental Baseline Study (EBS) and an Environmental Assessment (EA), with a finding of no significant impact (FONSI), must be completed for each AR project. Preparation of these documents is the responsibility of the RSC, but the design team must become familiar with any requirements from the studies which are to be included in the design, such as erosion control measures.

2.3.2 See Paragraph 2.2.1.3.4 above for environmental permitting requirements.

2.4 Site Selection and Planning

2.4.1 General Selection and Planning Criteria

2.4.1.1 In most cases, the project site will have already been selected, based on the following characteristics. If the Design Agency is involved in site selection, the factors below, along with the budget, are important factors to be considered. For additional site selection considerations, see Section 2.5, Antiterrorism/Force Protection.

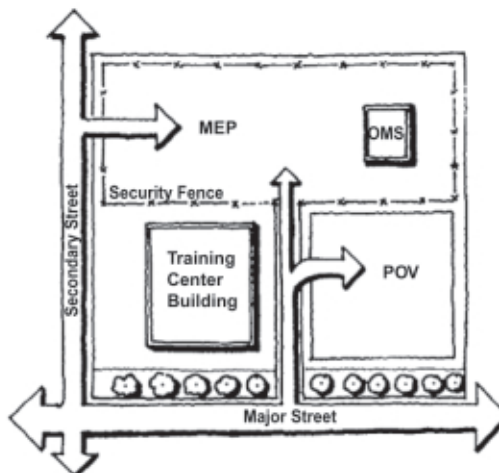


Figure 2-3 Site Access

2.4.1.1.1 A relatively level site, suitable for the parking of military training vehicles.

2.4.1.1.2 A high public visibility of the training center building.

2.4.1.1.3 A buffered area of the site should be available to mask the noise and disruption caused by exterior training exercises and military equipment usage.

2.4.1.1.4 An easily accessible site.

2.4.1.2 The standard AR training facility consists of the training building, the organizational maintenance shop (OMS) with military equipment parking (MEP) area, and the privately-owned vehicle (POV) parking area. The interrelationship of these spaces and their appropriate site orientation require careful study. As the major point of activity and public access, the training center building should dominate the community interface of the entire facility and must be visible from adjacent public areas. The MEP and OMS also should be located relatively near the training center building for economical accessibility and to afford a showcase for public relations purposes. The location of the OMS and MEP, and whether community concerns necessitate visual screening of these functions, should be reviewed with the Tenants.

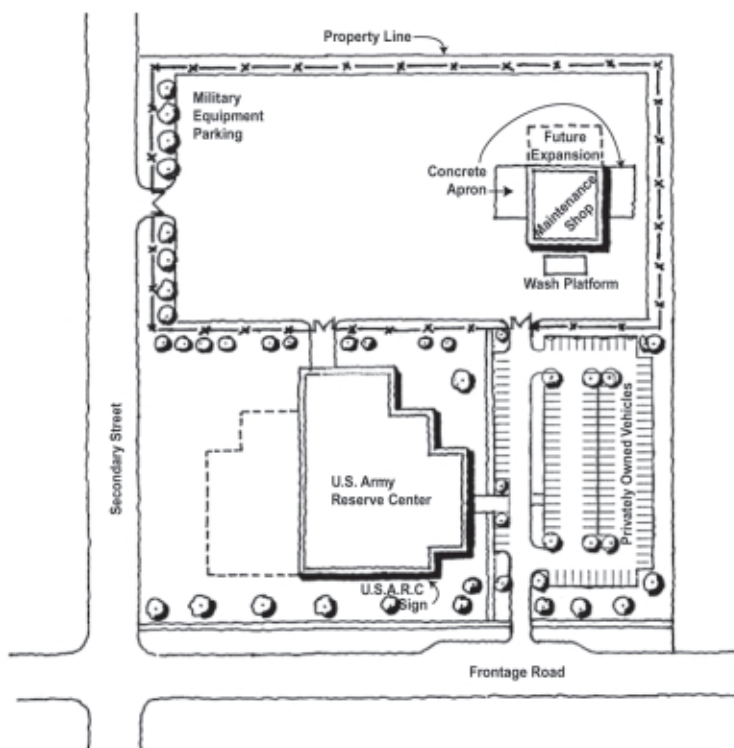


Figure 2-4 Typical Reserve Center Site Plan

2.4.1.3 As a general rule, the training center building, due to its high usage and the desire to provide high community visual presence, will be located on the most visible side of the site. The POV parking area is best located behind or adjacent to the training center building. The OMS/AMSA is an individual structure located away from the training center building to minimize noise and disruption. Most Tenants prefer that the administrative portions of any OMS/AMSA building be nearest the training center.

2.4.1.4 The general direction above tends to divide the site into two zones: an administrative zone for the training center and the POV, and a more utilitarian zone for the OMS and MEP. If possible, without duplication of roadways, a site design should be developed to minimize vehicle circulation interference between traffic for the two zones.

2.4.1.5 Site access must be direct, safe and efficient to minimize the environmental impact of military vehicle traffic. The design should minimize access points but provide adequate acceleration and deceleration lanes at the primary entrance(s). Standard traffic planning practices will be adhered to. To the extent practical, keep POV and military traffic separated. Avoid, if possible, restrictions for site entrance and exit, such as “right-in, right-out” access only.

2.4.1.6 The schematic design concepts for both the site and the buildings should be based on a simple, logical idea which satisfies the requirements of the program, site, Tenant functions and long life maintenance. Each project is individual and requires a concentrated effort to develop the appropriate solution.

2.4.1.7 The building and main facility entrance should be apparent to passing traffic while meeting Antiterrorism/Force Protection (AT/FP) requirements, to ensure community visibility and ease of access. Visitor parking and the main entry to be used by building visitors should also be readily identifiable.

2.4.1.8 AMSA and/or ECS sites, when not collocated with a training center or OMS, should be arranged for functionality and vehicle access with consideration for future expansion.

2.4.1.9 When practical, orient the longest sides of buildings along an east-west axis. This orientation will generally result in most windows facing north and south to minimize solar heat gain. At extreme latitudes, energy savings may be better with different building orientations.

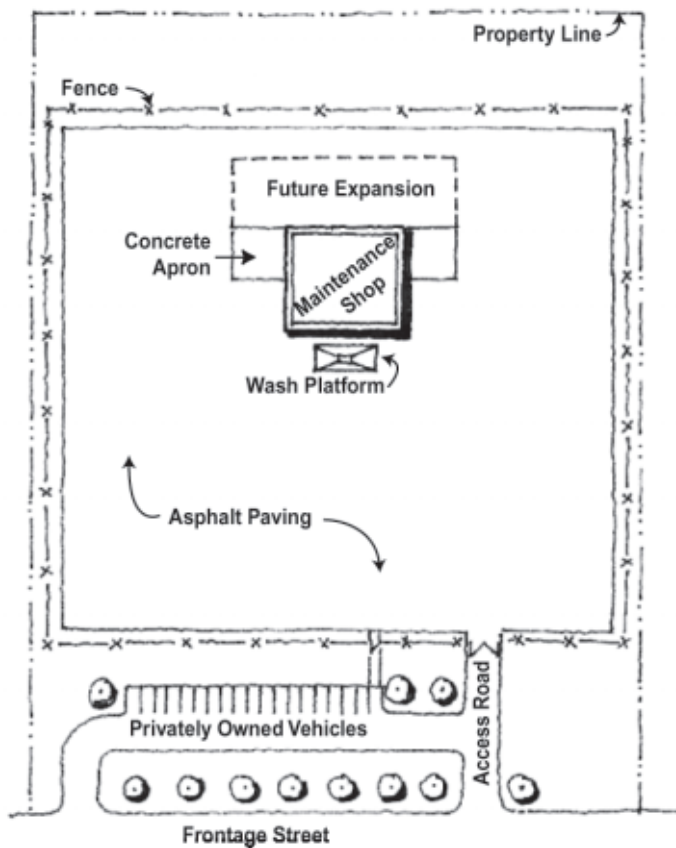


Figure 2-5 Typical AMSA Site Plan

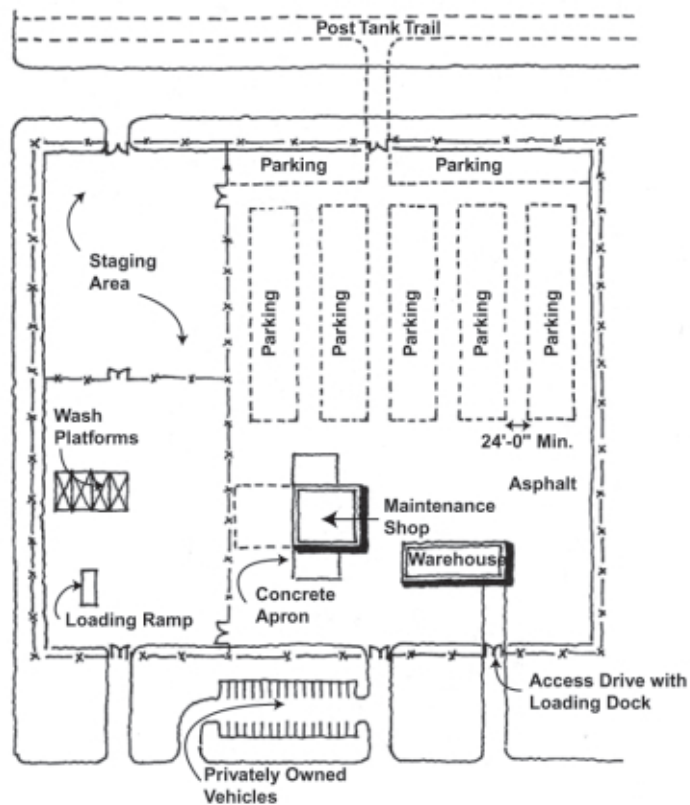


Figure 2-6 Typical ECS Site Plan

2.4.2 Availability of Utilities

2.4.2.1 It is the Design Agency's responsibility to verify availability and capacities of all utilities required for the project. Contacts will be made with the utility providers, and records of all discussions should be made and copied to the provider. Any required applications, permits, reviews, fees, design/construction requirements, or service upgrades should be identified, and their impacts on design and construction costs and schedules should be calculated. If alternative providers exist for any utility, the designer should identify the alternatives to the Design Agency as early in the design process as possible, and verify whether a formal study of the alternatives is desired to provide comparative costs, benefits, and drawbacks.

2.4.2.2 It is obviously preferable that utilities be available at or near the boundaries of the site. Extension of off-site utilities to the site will likely require third party (utility company, municipality, utility district) engineering and/or construction, and possibly acquisition of additional utility easements. Any such off-site work will require additional lead time, and may require formal requests or petitions for approval.

2.4.2.3 Development of on-site systems is not generally desirable; additional land may be required to prevent interference with on-site water supply and waste water disposal systems. In addition, development of sufficient on-site water supply or storage for fire protection and waste water treatment capabilities will add appreciably to typical project costs.

2.4.2.4 Gas, electric and telecommunications utilities operate in a competitive environment in many locations, and more than one source of service may be available to the site. Service area agreements between utilities may also be in effect that will limit which utility will service the site and need to be investigated. Information regarding standard rates for utility connection fees, capacity charges or area assessments and their method of payment should be collected.

2.4.2.5 Many Government installations have "privatized" the utility systems which were formerly under the ownership and operational control of the installation's Department or Directorate of Public Works. The privatized utility system owner should be determined and the necessary information gathered as outlined above. Utilities brought onto the site and constructed by the utility owner may also require that an easement be designated over the utility line to allow the utility company access to maintain and service its line(s). The Government generally prefers to avoid easements where practical.

2.4.2.6 On some Government installations, the installation may be a potential utility provider. The design team must verify that the Government has sufficient utility capacity, and also what entity would be responsible for the design, construction and funding of any required upgrades or extensions to the utility service.

2.4.3 Existing Jurisdictional Agreements

2.4.3.1 Some training centers or Government installations have written agreements with local jurisdictions which govern fire service, utilities, roadways, and similar issues. The designer must verify whether such agreements exist, and ensure that any requirements they impose are incorporated into the project planning.

2.4.3.2 If the facility is located near a civilian or military airport, the designer must verify the airport authority's requirements, which may not be written into any agreement but will still apply to project construction and operation. There may be height restrictions affecting both construction operations and the finished building(s), other airspace envelope restrictions, and requirements for noise insulation which must be a part of the planning process.

2.4.4 Floodways

2.4.4.1 All sites will be investigated to verify whether they contain designated floodways; this is typically a part of the EBS/EA effort. The information is normally available from local planning and zoning officials, or from public works water resources or planning sections on Government installations that have a public works directorate or department. The Federal Emergency Management Agency (FEMA) publishes maps of formally studied and designated floodways; their information is normally available through the state agencies responsible for the implementation of the state's flood plain or flood protection program.

2.4.4.2 The U.S. Army Corps of Engineers District (Civil Works) in which the site is located will also have information as to whether or not the site is protected by a Corps flood protection project.

2.4.4.3 Not all sites that flood are documented as part of a formal flood plain study or shown on floodway maps; this is usually referred to as small localized flooding, but may have a significant effect on any one site. Therefore, investigation of local reports of flooding on the sites may be needed. Many times, these reports are verbal or included in local newspapers. A preliminary hydrology/hydraulic

analysis may be needed to determine the relative frequency and level of flooding that will need to be mitigated by design of the site.

2.4.4.4 Floodway areas cannot normally be developed. Filling of flood fringe areas is restricted and will require re-analysis of floodway hydraulics if fill depths are exceeded; such filling may not be allowed.

2.4.5 Traffic Impacts

2.4.5.1 The development of an Army Reserve Center will normally result in additional traffic to the existing roadways at the site access point(s). As noted above, such access points should be minimized. The roadway from which access is gained will generally be under the jurisdiction of a public agency (state Department of Transportation, county, township or municipality). A Government installation with a public works department will be responsible for the installation roadways.

2.4.5.2 The responsible agency for the accessed roadway should be identified and contacted to review the project traffic planning. The designer should verify that the responsible agency has not delegated roadway use and planning to a subordinate agency or level (i.e., a state highway for which the state Department of Transportation is allowing the local municipality to determine turn lane requirements). As with utilities, any required applications, permits, reviews, fees, design/construction requirements, or service upgrades should be identified, and their impacts on design and construction costs and schedules should be calculated.

2.4.5.3 An estimate of the traffic generation information for the facility should be developed for the review with the responsible agency. It is not unusual for such agencies to limit the number and location of access points, or to require directional access (left- and right-hand turns), turn lanes, acceleration/deceleration lanes, or alignment and spacing in relation to existing access points.

2.4.5.4 Work on the accessed roadway is normally off-site construction and the responsible agency may or may not allow construction by another agency or “private” party within its right-of-way. The procedures for designing, permitting and implementing this roadway work and associated fees must be identified. The responsible roadway agency may also require a performance bond in its name for the value of the work in their right-of-way, if the construction is accomplished as part of the Government’s site construction contract.

2.4.6 Military Vehicle Information

2.4.6.1 The designers should verify what types of vehicles the Tenants will employ, and design site circulation and parking to accommodate them. These may include commercial delivery vehicles as well as the military vehicles operated and maintained by the unit(s). Site roadways and MEP areas are typically designed with turning radii to accommodate commercial over-the-road trucks, unless the Tenants indicate that they have vehicles which require larger maneuvering allowances.

2.4.6.2 The Tenants can provide a list of their vehicles and the delivery vehicles they anticipate, and should be able to provide vehicle specifications. Specifications for military vehicles can also be found in the technical bulletin TB 55-46-1, “Standard Characteristics for Transportability of Military Vehicles”, available online at the website www.tea.army.mil/si/tb55. This TB lists weights, but does not include turning radii; the designer will verify maximum anticipated turning radius vehicle with the Tenants, and ask them to provide the specs for that vehicle.

2.5

Antiterrorism/ Force Protection (AT/FP)

2.5.1 Terrorist attacks have demonstrated the vulnerability of U.S. military and civilian personnel, and the facilities in which they work. To address this vulnerability, the Department of Defense (DoD) established standards to ensure that force protection measures are incorporated into the budgeting, planning, design and construction of Military Construction (MILCON) funded facilities. The standards address both new construction and major renovation projects. They include minimum construction requirements, as well as measures that can be applied where higher threat levels are identified by the AR Installation. The Design Agency must request that a threat assessment be provided to identify the threat level at the proposed project site.

2.5.2 There are two current AT/FP criteria documents for AR facilities; the “Interim Department of Defense Antiterrorism/Force Protection Construction Standards,” and Unified Facilities Criteria (UFC) 4-101-01 “DoD Minimum Antiterrorism Standards for Buildings.” The design team must verify which standard is applicable to the specific project. The Interim document includes the 4 April 2000 paper “Progressive Design Collapse,” and the 20 September 2000 memo “AT/FP Guidance for USAR Construction.” The appropriate AR Installation security personnel must also be identified and involved in discussions of AT/FP considerations.

2.5.3 This criteria mandates measures to be taken in both site and building

design, and can have appreciable impact on site and building planning, and on construction cost. Designers are advised to incorporate AT/FP requirements at the earliest stages of design. A brief summary of some of the minimum construction requirements:

2.5.3.1 The AT/FP site criteria require, at a minimum, provision of standoff zones to separate buildings from parking, roadways, and other buildings. The standoff zones increase the minimum amount of land required to provide a compliant and functional site layout, and should be considered during site selection. For elevated threat levels, vehicle barriers might be required.

2.5.3.2 Several building design/construction measures address structural design and the threat of progressive collapse in the event of a bomb blast. These measures discourage building designs of more than two stories due to the associated costs.

2.5.3.3 Other measures address locations of certain spaces, exterior glazing, utility locations/routing, locations of HVAC air intakes, landscaping, etc.

2.6

Landscape

2.6.1 Landscaping must be an integral part of the facilities design process. Good landscape planning affords many valuable benefits. Planting design reflects an understanding of facilities goals and objectives, an appreciation for existing site conditions and an ability to enhance the outdoor environment through the integration of natural and cultural conditions in a sensitive and pragmatic manner.

2.6.2 Architectural character and sense of place is supported by proper landscape design, which introduces aspects of scale, color, texture, form, etc., to the living environment.

2.6.3 Traffic direction influenced by design of planted areas and strategic location of plant materials can support aspects of wayfinding and reduce the need for supplemental site graphics. Good design encourages safety and assists in the resolution of conflicts between the automobile and the pedestrian.

2.6.4 Appropriate selection and location of plants reduces water erosion, emphasizes ecological control, lessens proximate environmental impact and promotes clean water through the introduction of natural filtration methods.

2.6.5 Landscaping provides environmental buffers from harsh winds and intense solar conditions. Strategically located windbreaks minimize the

effects of wind erosion and snow disposition upon the outdoor environment. Proper selection and location of tree species promote energy savings and create more comfortable and habitable outdoor places.

2.6.6 Plant materials provide focus and reinforce positive views. Proper landscape treatment can screen unsightly structural elements and buffer poor visual panoramas.

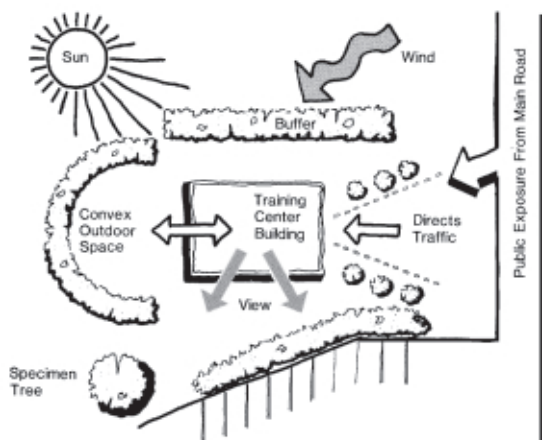


Figure 2-7 Landscape Planning

2.6.7 Quality, usable outdoor spaces are created through an understanding of existing conditions, programmatic needs and well-developed landscape architectural concepts. Landscape design and the selection of materials must reflect the mission of the facility and Tenants' needs. Planting must be functionally and esthetically appropriate and reflect aspects of safety and security as outlined in the Department of Defense Antiterrorism/Force Protection Standards.

2.6.8 Plant material selection will afford permanent, low maintenance appropriate to the facility's location. Vegetation must be able to be maintained with a minimum effort, be vandal resistant, hardy and disease resistant. The use of drought tolerant, indigenous vegetation that incorporates aspects of sustainability is strongly encouraged.

2.6.9 Trees, shrubs and groundcovers must be hardy to the region in which the facility is located and must be horticulturally appropriate to the site-specific location in which they are planted. Consideration should be given to adjacent structures and improvements such that the landscaping does not adversely impact them. On some Government installations, the Department of Public Works (DPW) may have a list of preferred plant materials.

2.6.10 Trees and shrubs should be carefully selected to prevent clogged gutters and drains by leaves and blocked sewer lines due to root damage.

2.6.11 Refer to TM 5-803-13/AFM 126-8 for comprehensive landscape design considerations.

2.7 Buildings

2.7.1 General Design Considerations

2.7.1.1 Esthetics – Architectural Style and Character

2.7.1.1.1 The military facility, by its presence, represents national security, strength, austerity, efficiency, professionalism and pride in country and community.

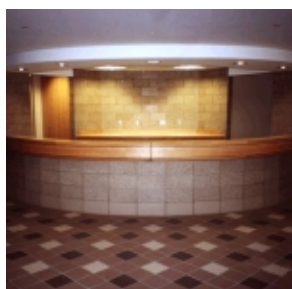
2.7.1.1.2 Each facility is also the home and workplace of the soldiers it houses, and should provide them with a feeling of pride and ownership. An attractive facility can enhance the Tenants' sense of identity, and serve as one tool for the recruitment of new soldiers.

2.7.1.1.3 The architecture should be sensitive to the style, scale and materials of the local region not only for esthetics but also for function. Many local building forms and design statements are a direct outgrowth of a region's environmental and cultural characteristics.

2.7.1.1.4 The facility's style should blend into the existing architecture of the surroundings. Although trendy designs should be avoided, a facility distinctive in appearance can enhance the Tenants' sense of identity and pride of ownership. The character should also evoke a sense of pride in the nearby neighbors as well as the entire community. The AR wants to be a good neighbor, and a solid member of the community.

2.7.1.1.5 Materials should be selected to be esthetically pleasing, easily maintained, and cost effective. Standard exterior finish materials approved by the Using Service in the development of MDS are described in Chapter 3.

2.7.1.1.6 Many training center spaces will not have windows, for security reasons or by Tenant preference, such as unit storage, COMSEC training and storage, AGCCS, SCIF, and others. The designer may want to locate these spaces away from major facades to allow use of fenestration on those elevations.



**Figure 2-8
ARRTC VOQ,
Ft. McCoy,
Wisconsin**

2.7.1.2 Flexibility and Economy

2.7.1.2.1 Internal flexibility should be planned as much as possible to absorb much of the growth and change of the facility over its life as units change their training emphasis. For example, a facility may be designed to accommodate infantry training and then, after a period of time, may need to be changed to accommodate a medical unit. This may require additional maintenance/shop space and a decrease in the unit storage area. If a facility is designed with internal flexibility of building systems, it can accommodate change more economically. Therefore, the design of office areas should not be too closely tailored to the units currently assigned but should be more generic in design, providing a balanced ratio of exclusive office space to common office space.

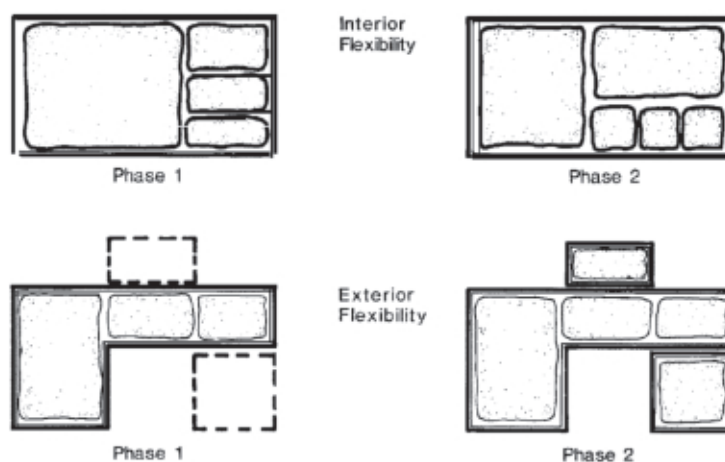


Figure 2-9 Flexibility for Future

2.7.1.2.2 External flexibility should also be planned to accommodate the potential for growth of the facility. This requires proper siting and utility planning, and a building systems approach to design, universally applied to the facility.

2.7.1.2.3 Economy of design will be taken in its broadest sense: initial cost, maintenance, and building system flexibility. Consider the following flexible building systems:

2.7.1.2.3.1 Architectural: Durable and easily maintainable finishes, modular carpet, detailing which largely avoids custom fabrication, use of standard doors and windows, etc.

2.7.1.2.3.2 Structural: Strive for a regular column spacing layout, preferably at 9600 mm (32 ft) each direction, to provide remodeling and interior space planning flexibility and economical structural systems.

2.7.1.2.3.3 Mechanical: For large reserve centers, use VAV or fan coil systems which allow simple relocation or addition of zones to meet future zoning requirements, which may change over the life of the project.

2.7.1.2.3.4 Electrical: Manufactured flexible wiring for light fixtures in lay-in ceilings, warehouse and storage area ceilings. Main electrical room and electrical closets located adjacent to load centers. Telephone rooms and IT rooms located in the center of the building within 50 meters of the most remote outlet. Spare capacity in distribution equipment for future expansion or additional loads. Run empty conduits for future expansion areas. Run cable trays for communication wiring. To extend power supply and communication system to electrified partitions, use power poles in existing buildings and use flush floor boxes/poke-through boxes in new facilities. Minimize the use of power poles in new construction open office areas.

2.7.1.2.4 Provisions for future expansion must be designed into each project, especially new centers. In the training center buildings, expansion will primarily consist of administrative, classroom and unit storage spaces. The OMS will be sited to allow for the construction of additional workbays. MEP and POV areas will be sited to accommodate increased parking requirements associated with increases in personnel and equipment.

2.7.1.3 New Construction, Alterations and Additions

2.7.1.3.1 The criteria and requirements contained within this Guide pertain to all three types of projects: new construction, alterations and additions. It is recognized, however, that due to the architectural configuration of the existing facilities and the remaining life of its systems and other considerations, it may not be feasible in alteration projects to meet all new construction standards. Professional judgment is required to design a building which combines old and new portions into a harmonious finished design to provide a complete and usable facility at the

lowest life cycle cost. As soon as possible after design initiation, the Design Agency should conduct a detailed facility investigation to establish the limits of construction. These limits will be stated in narrative form along with a checklist of required repairs/demolition to be included with the Project Engineering, preconcept (10 percent), or charrette submission. Investigations will include the following:

2.7.1.3.1.1 Review required real property maintenance and repair work. Consult the facility manager and the AR Installation (BMAR) list.

2.7.1.3.1.2 Verify accuracy of as-built drawings.

2.7.1.3.1.3 Determine adequacy of supporting utilities.

2.7.1.3.1.4 Determine the status of the following building components: structural, fire protection, electrical, plumbing, and HVAC systems; windows; roof; exterior and interior walls; doors and hardware; stairways; insulation.

2.7.1.3.1.5 Based on the above and the Project Documents, recommendations as to the extent of the demolition and remodeling, including reuse or replacement of existing equipment, for the consideration of the Using Service.

2.7.1.3.2 The Government will perform any studies required to verify economic viability or remaining life of existing facilities (AR 415-20) considered for alterations or additions.

2.7.2 Training Center (TC) Functional Relationships

2.7.2.1 General

2.7.2.1.1 The training center spaces are organized into the following groups:

- Administrative
- Assembly/Kitchen
- Weapons
- Educational
- Storage
- Special Training
- Support

2.7.2.1.2 As a general rule, the TC should be organized so that the spaces in each group are adjacent or in close proximity; i.e., administrative spaces should be grouped to the extent possible, possibly in one wing of the building. This is not necessarily true of all the storage, special training, and support group spaces.

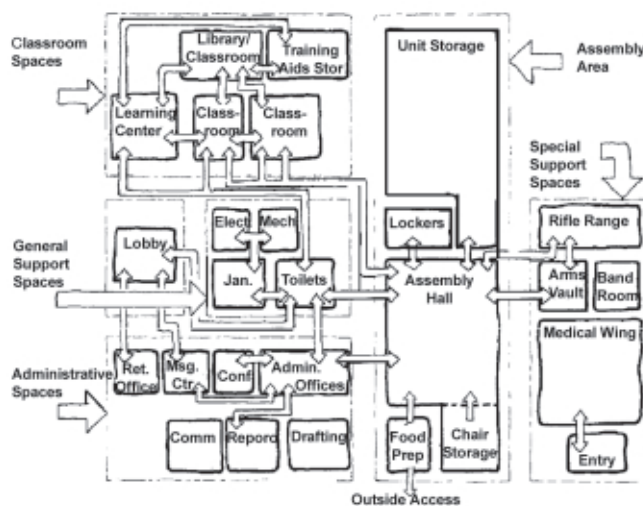


Figure 2-10 Training Center Adjacencies



**Figure 2-11
USARC, Green Bay,
Wisconsin**

2.7.2.1.3 The janitorial, facility maintenance, support and similar spaces should be distributed throughout the building. The special training spaces should be located near spaces similar in function, or near the specific Tenants that utilize them most. In some cases, such as a band room, the spaces may function best if they can be somewhat isolated from other functions. Tenant preferences should always be considered, along with overall flexibility.

2.7.2.1.4 The training center typically functions efficiently when organized around a central lobby space, so that circulation distances are minimized. The elevator and a stair should be adjacent to the lobby in multistory training centers.

2.7.2.1.5 Administrative Adjacencies

2.7.2.1.5.1 Some of the administrative spaces should be adjacent to the lobby. There is no receptionist, so a full-time office or the recruiting/retention office should be located to monitor the lobby.

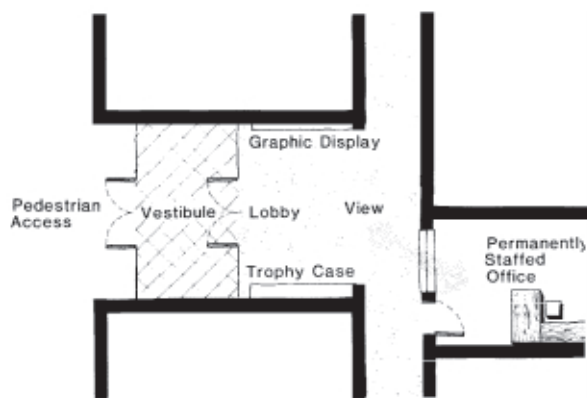


Figure 2-12 Lobby and Full-time Office

2.7.2.1.5.2 Full-time offices should be clustered around unit common space, and located on exterior walls to allow windows to the extent possible. Full-time offices that cannot be placed around the unit common should generally be located on main corridors. Multiple, smaller unit commons areas with offices surrounding them are typically preferable to a single, large unit common, for reasons of flexibility. It is preferable that all administrative areas are within 15 meters (50 feet) of a restroom.

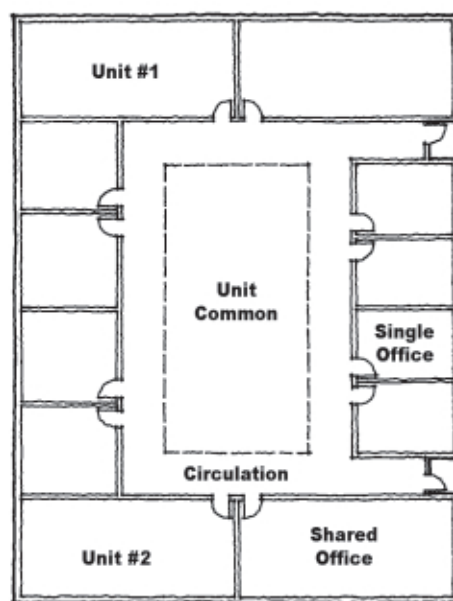


Figure 2-13 Office/Unit Common Relationship

2.7.2.1.5.3 Exclusive offices require the same adjacencies as full-time offices.

2.7.2.1.5.4 Unit common space should be adjacent to full-time and exclusive offices, and to administrative support spaces.

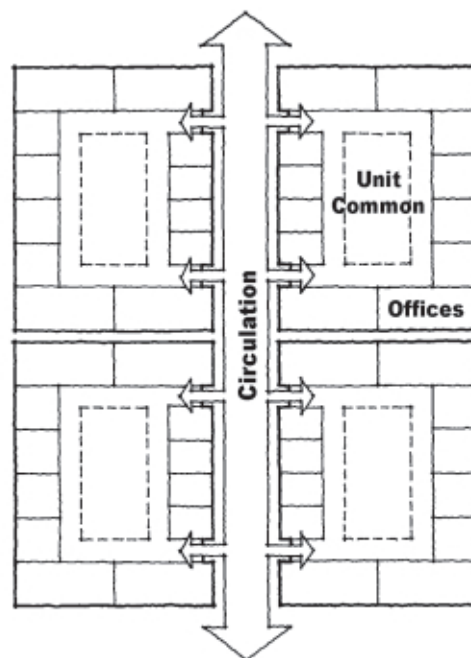


Figure 2-14 Multiple Unit Commons

2.7.2.1.5.5 The recruiting retention office should be adjacent to the lobby for both monitoring and ease of location by potential recruits.

2.7.2.1.5.6 The message center/mailroom should be located away from heavily populated areas and critical infrastructure of the building, and on an outside wall, as AT/FP measures. The travel distance to other administrative areas should be as short as possible while maintaining AT/FP criteria.

2.7.2.1.6 Assembly/Kitchen Adjacencies

2.7.2.1.6.1 The kitchen and the chair and table storage spaces will always be adjacent to the assembly hall; the meals from the kitchen are served in the assembly hall, and the storage space is the location for the assembly hall furniture when it is not in use.



Figure 2-15
USARC, Ft. Dodge,
Iowa

2.7.2.1.6.2 The assembly hall should also be adjacent to the arms vault and armorer; weapons are issued from the armorer, and weapons training sometimes occurs in the assembly hall.

2.7.2.1.6.3 An adjacency with the lobby should be considered; the lobby can provide the gathering and dispersal space required for large numbers of people.

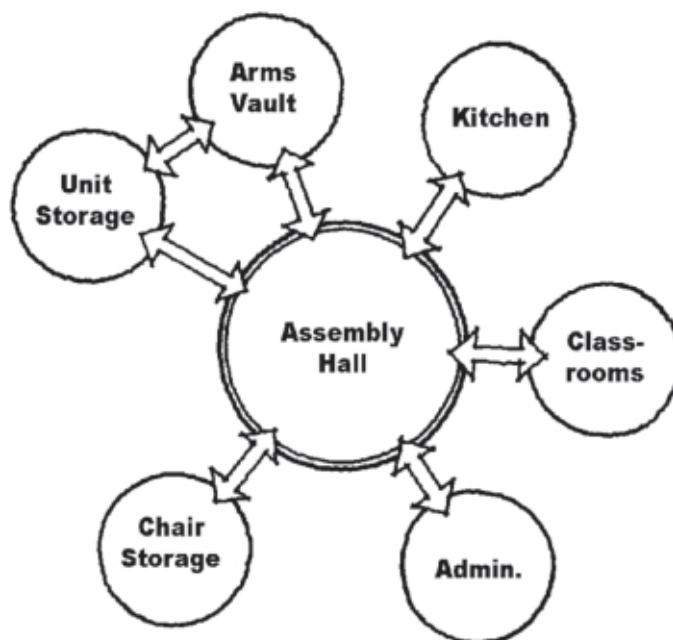


Figure 2-16 Assembly Hall Adjacencies

2.7.2.1.6.4 The kitchen is best located at the rear of the building; the equipment and refuse associated with the kitchen should not be on a building visitor's entry path.

2.7.2.1.7 Weapons Adjacencies

2.7.2.1.7.1 The armorer is always located immediately adjacent to the arms vault; entry to the arms vault must be through the armorer's space for control of the weapons.

2.7.2.1.7.2 The weapons area should also be near, or open directly into, the assembly hall, as weapons training sometimes occurs in the assembly hall.

2.7.2.1.7.3 The weapons area should also be near the staging area for ease of moving all weapons onto transport for maneuvers.

2.7.2.1.7.4 The weapons area should be on a circulation route that is frequently used to provide additional security against attempted theft.

2.7.2.1.7.5 The vault should not be located on an outside wall for security reasons.

2.7.2.1.8 Educational Adjacencies

2.7.2.1.8.1 The educational group of spaces is preferably located away from the administrative areas to minimize noise as soldiers come and go, and near an exit. Classrooms should be grouped together, off a single corridor if possible, and with training aids storage adjacent.

2.7.2.1.8.2 The library reading, library storage, and learning center should be grouped together. These spaces are generally used for individual study, and need not be immediately adjacent to the classrooms.

2.7.2.1.8.3 The COMSEC training and storage rooms should be adjacent with entry to the storage room from the training room. They should be located near the classrooms.

2.7.2.1.9 Storage Adjacencies

2.7.2.1.9.1 Unit/individual storage should be located near the assembly hall, which may be used for training with or maintaining the equipment.

2.7.2.1.9.2 Supply offices are typically located in the unit storage space, and overlooking the staging area, to provide the supply officers with visual monitoring capability of the stored materials. An exterior wall location, with a window overlooking the service drive access to the staging area is generally preferred.

2.7.2.1.9.3 The staging area is also located in the unit storage space, with an overhead door to an exterior driveway, to allow efficient marshaling of the equipment and transfer onto transport. Some Tenants prefer a depressed loading dock arrangement outside the staging area if site conditions allow.

2.7.2.1.9.4 The janitorial and facility maintenance spaces should be centrally located to be convenient for maintenance of the building, off a main corridor for easy access. In larger buildings, it is desirable to use the authorized space to create multiple rooms throughout the building for maintenance convenience. Janitorial spaces should be located near toilets, where practical, for plumbing efficiency.

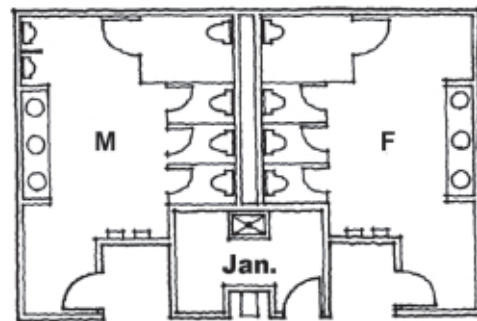


Figure 2-17 Janitorial and Toilets

2.7.2.1.9.5 A portion of the facility maintenance space should be dedicated to recycling, with an area to sort and store recyclable materials awaiting pick up. This area should be located near an exit for easy transfer, preferably an exit that is accessible to vehicles.

2.7.2.1.9.6 Flammable storage and controlled waste storage are not typically authorized for training center buildings collocated with an OMS. If authorized, these spaces should be on an exterior wall with only an exterior access. They should also be near a vehicle access for easy transfer to transport for delivery to and removal from the facility.

2.7.2.1.10 Special Training Adjacencies

2.7.2.1.10.1 Medical section, physical exam, photo lab, soils testing lab, drafting room, AGCCS, and some less common special training spaces have no specific adjacencies. They should be located near the unit that has the mission they support, and some should be separated from noisier activities.

2.7.2.1.10.2 The weapons training space now utilizes an electronic simulator, the engagement skills trainer, and has no specific adjacencies. The electronic weapons used can be stored in a closet in the room; they need not be in the arms vault. Weapons training could be located near the classrooms for possible occasional use as a classroom.

2.7.2.1.10.3 The band room is often located near the assembly hall; however, the main criteria for its location is minimizing sound transmission to other parts of the building, especially to administrative and classroom areas.

2.7.2.1.10.4 The physical readiness space should be located adjacent to toilets, showers and lockers, and remote from the main entry and formal spaces. The space should have a short route of access to the exterior, since many of the soldiers will run as part of their training – a door directly to the exterior is desirable, if practical, but should avoid the main entry path to the building.

2.7.2.1.10.5 A conference room for a training center is almost always associated with a General officer, and should be located within 15 m (50 ft) of the General's office, and adjacent to full-time staff. In most instances, it will be located within the General's suite.

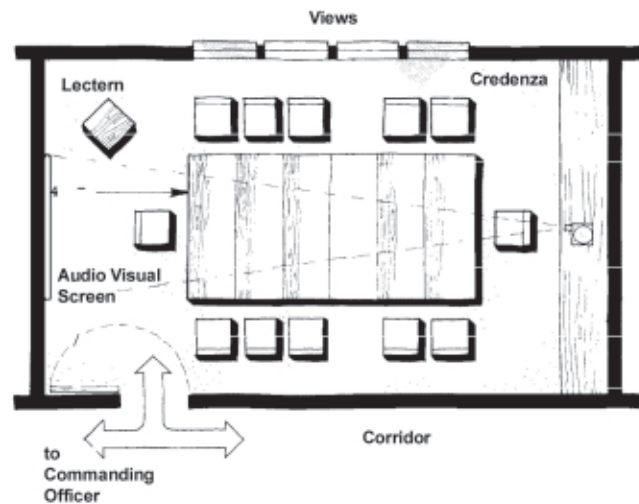


Figure 2-18 Conference Room

2.7.2.1.11 Support Adjacencies

2.7.2.1.11.1 Toilets should be centrally located for the Tenants' convenience, and toilets should be provided on each floor of multistory buildings. In larger buildings, consider splitting the space authorization not only between floors, but to provide more than one set of toilets per floor.

2.7.2.1.11.2 Locker and shower rooms should always have a portion of the toilet space authorization located with them. The locker and shower rooms should be adjacent to the physical readiness space.

2.7.2.1.11.3 The locations of the break area and vending alcove are flexible, based on Tenant preference, but the break area should be located away from the entry, lobby and formal spaces of the facility to minimize noise and food odors transmitting to those spaces. A central location is preferable for Tenant convenience. The vending alcove is frequently collocated with the break area, but can be broken into smaller spaces to distribute vending machines throughout a larger facility.

2.7.2.1.11.4 Mechanical, electrical and telephone rooms should be located, and distributed through the building, for efficiency of function and building distribution. The main mechanical room should be

on an exterior wall with exterior access to a drive for ease of maintenance, repair, and replacement work. Architectural, mechanical and electrical disciplines must coordinate size and location of building support spaces to provide sufficient space for equipment installation, operation and maintenance, as well as efficient distribution of services.

2.7.3 OMS Functional Relationships

2.7.3.1 An optimal space arrangement for an OMS would have several of the OMS spaces opening directly into the workbays. NFPA 101 no longer allows occupants from a corridor to exit through another space; any corridors must be arranged to provide the required number of exits without exiting through the maintenance bays. In addition, any corridor which leads to a maintenance bay must not exceed required dead-end distances. Larger facilities should have corridor arrangements similar to those shown in the Figures in this Section.

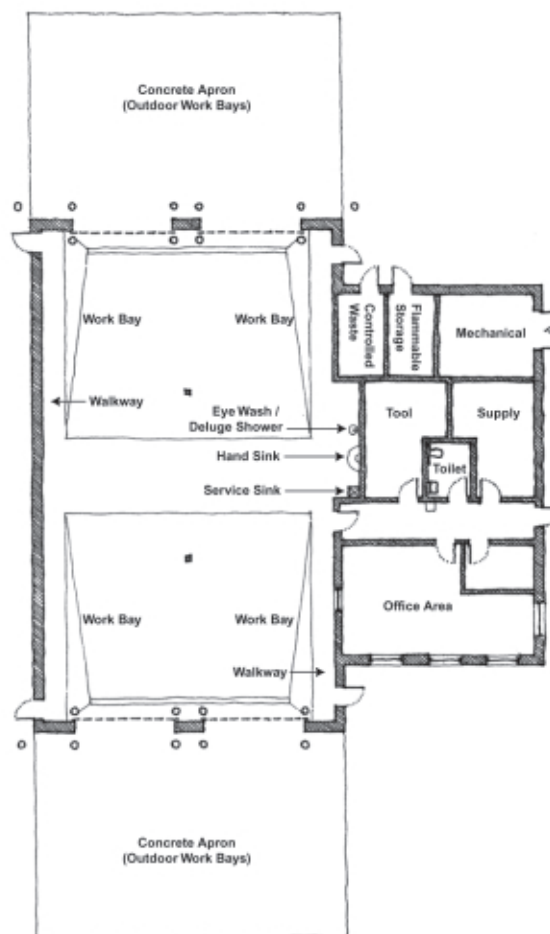


Figure 2-19 OMS Schematic Diagram

2.7.3.2 The shop office, tools and parts storage, toilet, storage room and battery room are all closely associated with the workbays, and should be as nearly adjacent to them as possible.

2.7.3.3 The shop office should overlook both the workbays and the MEP for control and security purposes.

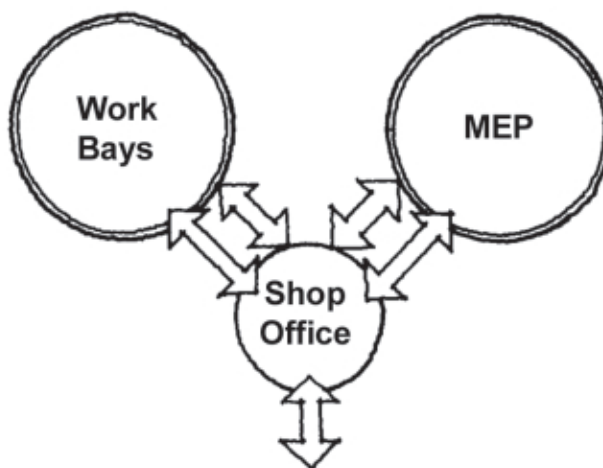


Figure 2-20 Shop Office Views

2.7.3.4 The flammable storage and controlled waste storage rooms must open only to the exterior of the building.

2.7.3.5 The OMS mechanical space must also accommodate janitorial, electrical, telephone, and IT space requirements. Some codes and some Tenants require that these spaces be separate. They are best located off a corridor, and need not be adjacent to the workbays. Where climate permits, they could be accessible from the exterior of the building only.

2.7.4 Unheated Storage Functional Relationships

2.7.4.1 The unheated storage building serves only one function: the storage of operational equipment that requires no temperature or humidity control. A pre-engineered metal building system is frequently used to house this function.

2.7.5 AMSA Functional Relationships

2.7.5.1 An AMSA is very similar to an OMS, with some additional spaces added. AMSA functional relationships are also the same as those for an OMS - see Paragraph 2.7.3.

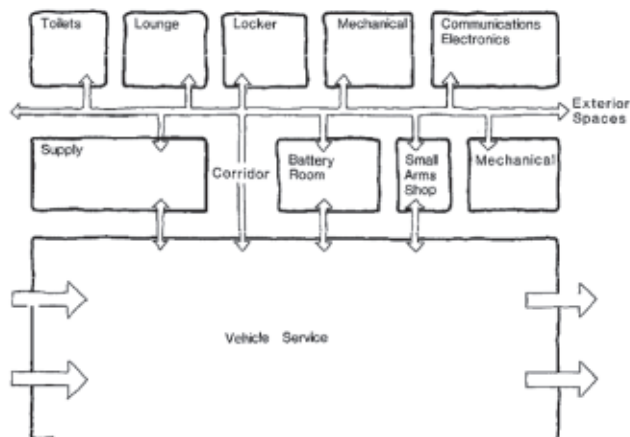


Figure 2-21 AMSA Schematic Diagram

2.7.5.2 Since an AMSA has full-time staff, a break area, and male and female toilet, shower and locker rooms are provided. They should be located adjacent to each other and need not be immediately adjacent to the workbays.

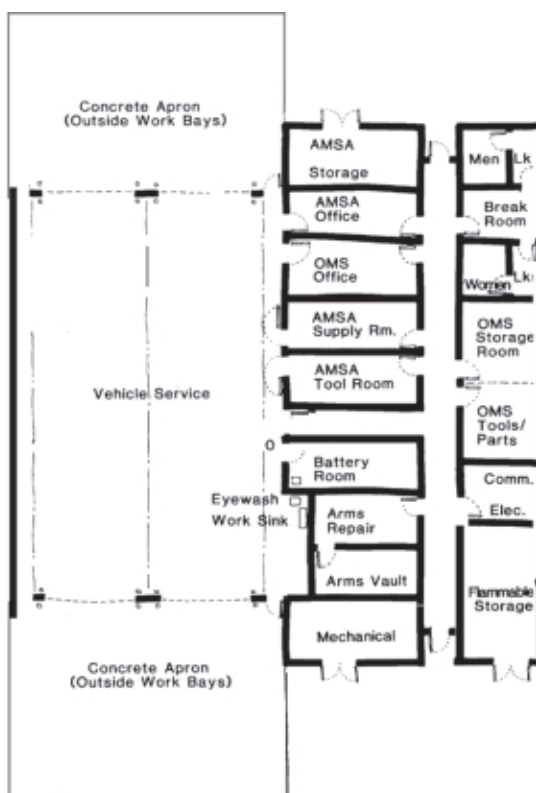


Figure 2-22 Joint OMS/AMSA Schematic Diagram

2.7.5.3 In addition to the standard areas of an OMS, an AMSA is often authorized additional special maintenance offices, such as a supply room, an electronics/communication repair room, or a small arms repair shop and vault. All of these rooms would be best located adjacent to the workbays, if space and NFPA 101 allow. They may also be located off a corridor leading to the workbays.

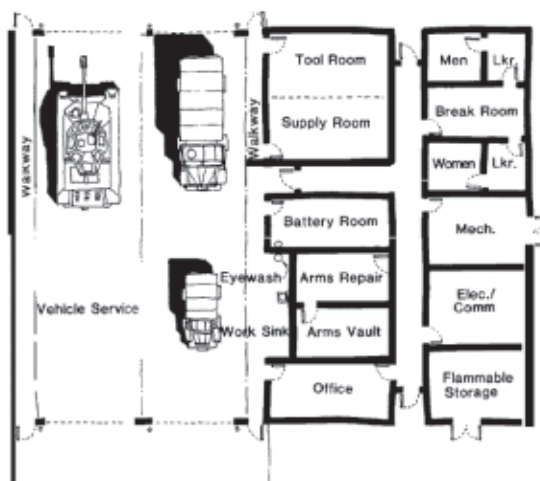


Figure 2-23 AMSA Schematic Diagram

2.8

Fire Protection/ Life Safety

2.8.1 The primary criteria document for fire protection and life safety in AR facilities is MIL HDBK 1008C. New construction of training center, OMS, AMSA, and warehouse buildings generally includes fire sprinkler systems for protecting the occupants and building structure from fire. Unheated storage buildings are typically not covered by fire sprinkler systems, unless they are larger than 465 sq m (5,000 sf), because the value of the contents does not warrant the additional expense. The criteria for providing and designing sprinkler systems is included in MIL HDBK 1008C; OMS and AMSA buildings are considered to be “shops”.

2.8.2 The design criteria identified in MIL HDBK 1008C must be conveyed to the contractor’s sprinkler system designer on the contract documents. Note that the hose stream and remote areas for various hazard classifications are more stringent than NFPA 13 requirements. Identify design densities for water flow and sprinkler types on a room-by-room basis so hydraulic calculations may be performed. Flow test data must be provided for the contractor to determine if the cost of oversized piping will need to be included in the bid.

2.8.3 In addition to MIL HDBK 1008C, other design criteria may be applicable. ETL 1110-3-446 provides thrust block design guidance. For

aircraft hangar projects, ETL 1110-3-481 covers AFFF clean up requirements, ETL 1110-3-484 covers fire protection for fixed wing aircraft and ETL 1110-3-485 covers fire protection for helicopter hangars.

2.9 Interior Design



Figure 2-24
ARRTC VOQ,
Ft. McCoy,
Wisconsin

2.9.1 The interior environment must respond to the needs of the facility as well as the individuals who occupy it, and should be functional, esthetically pleasing, and cost effective. In addition, the interior environment should provide a humane setting to promote a sense of belonging and well-being for the personnel. The following Sections provide criteria that will be considered to meet these goals.

2.9.2 The interior environment will be developed in coordination with the architectural design. All features of the building, including moveable furnishings and equipment, will be coordinated as parts of the overall design concept.

2.9.3 Through the planning process, the nature and configuration of the space can be examined. The adjacency requirements between the functional elements of an organization, adjacency priorities, work flow and patterns of communication will be initial considerations in the design process. Other factors will include multiple use of space and flexibility for future uses and growth. Overall, the primary goal of space planning is to convert functional program requirements into a workable, esthetically pleasing environment.

2.9.4 Materials and finishes should not be selected for external appearance alone; they will ultimately affect the acoustical, lighting, insulating, fire rating and maintenance factors of an environment. Any selection must satisfy esthetic and functional requirements regarding durability, wearability and maintenance. To a great extent, AR has predetermined the materials and finishes they desire. These are listed with the individual rooms in Chapter 4. Where selection options have been authorized, the above criteria will be considered.

2.9.5 Emotional responses are, to a great extent, the product of color and its character and quality as encountered within the environment. These responses are influenced by the viewing conditions, the use of color on surrounding objects and surfaces, and the size and relationships of these factors. Color can stimulate the imagination and create, attract, and maintain interest. Handled knowledgeably, imaginatively, and wisely, it is one of the most economical, yet psychologically satisfying and successful elements of the interior environment.

2.9.6 Specification of proper furnishings is critical to the performance and operational success of any facility. The standard criteria by which quality

and appropriateness may be evaluated include function, moveability, adjustability, maintenance, durability, comfort, and cost.

2.10 Information Technology

2.10.1 The primary criteria document for the design of information technology areas for AR facilities is the paper “USAR CIO Information Technology Requirements for Military Construction Army Reserve.” This paper prescribes area allocations and equipment arrangements for AR facilities based on their size.

2.10.2 Commercial Building Telecommunications Wiring Standard -TIA/EIA-568: The Design Agency should review the latest design standards for telecommunications and fiber optic cabling and comply with TIA/EIA-568-B.1 “General Requirements”, TIA/EIA-568-B.2 “100 Ohm Balanced Twisted Pair Cabling”, and TIA/EIA-568-B.3 “Optical Fiber Cabling Components.” Additional design criteria for inside and outside plant signal distribution systems is available from ETL 1110-3-502 “Telephone and Network Distribution System Design and Implementation Guide.”

2.10.3 The Design Agency is responsible for designing and specifying a complete telephone communications system, including handsets, to be fully operable at completion of construction. Using Service preference is for the telephone service provider to supply any required switch, either on-site or through remote service, through a service or leasing agreement which includes maintenance and upgrades. Using Service believes this strategy is preferable to purchasing an on-site telephone switch, which could quickly become obsolete with advances in technology. If the AR Installation prefers to own their switch, it will be provided by the RSC; designer must verify whether contractor or Government will install, program and connect the switch.

2.10.4 In general, each workstation will require a telephone outlet, but not all workstations will receive a telephone handset. The project documents prescribe the number of handsets for the project.

2.10.5 The Design Agency is also responsible for designing and specifying LAN cabling and conduit, termination blocks and equipment racks. LAN cabling should be routed from the network operations center (NOC) to the IT hub rooms, and from the IT hub rooms to individual workstations. The AR Installation IT staff is responsible for designing the facility LAN, and will provide input for cabling requirements.

2.10.6 In general, each workstation will require a data connection. No data cable run should exceed 100 meters (300 feet) from a hub; the design must provide IT hub rooms to comply with this requirement. (USAR CIO

criteria suggest 50 meter maximum run, but TIA/EIA criteria govern.) Hub rooms in multistory buildings should be stacked.

2.10.7 As a general rule, AR prefers to bring both fiber optic and copper cable to its facilities when fiber optic cable is available, at a reasonable cost, near the site. Fiber optic cable should be run to the main telephone data room, on to the network operations center, and on to the IT hub rooms. Fiber optic cable is not typically extended beyond this “backbone,” and any extension requires approval by the Using Agency.

2.11 Signage



Figure 2-25
USARC, Camp
Parks, California

2.11.1 The Design Agency is responsible for designing and specifying signage for the building exterior and interior. The applicable criteria for signage is EP 310-1-6, “Graphic Standards Manual.”

2.11.2 Interior signage typically consists of a building directory, room name/numbers, accessibility, and similar signs.

2.11.3 Exterior signage typically consists of a center monument sign, parking accessibility signs, traffic directional signs (if required), and similar signs. If the facility is on a larger Government installation, the installation may have its own guidance for exterior signs; the Design Agency should verify whether such guidance governs.

2.11.4 The project signage will include “Minuteman” logo plaques for the project; one aluminum for the exterior and one bronze for the interior. These are Government-furnished and contractor-installed; designer will determine locations with Tenant input.

2.12 Accessibility

2.12.1 AR facilities must be designed to comply with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS), with the most stringent requirements governing. An exception to this requirement is made for OMS buildings, which are governed by UFAS only. This exception allows OMS restrooms to be designed without accessibility measures, as these facilities are assumed to be inhabited only by able-bodied soldiers.

2.12.2 Due to the threat of terrorism, the Design Agency should pay particular care to the requirements for accessible exiting, especially those addressing areas of refuge.

2.13 Security

2.13.1 The primary criteria for physical security for AR facilities are AR 190-13, “The Army Physical Security Program,” and AR 190-16 “Physical Security.” AR 190-11, “Physical Security of Weapons, Ammunition and Explosives” governs the design of weapons storage spaces. The Design Agency should also coordinate its work with the AR Installation and the Provost Marshal Office (PMO), which is responsible for the physical security of the facilities.

2.13.2 Consideration should be given not only to securing facilities and equipment from damage or theft from the outside, but also to securing each unit’s equipment within the facility. The units and soldiers are responsible for their equipment, and will want it segregated and secured from other units.

2.13.3 Once the facility is occupied, the PMO will conduct periodic inspections to ensure that appropriate security measures are in place. The Tenants are graded on these inspections; the facility design should ensure that the physical security measures meet their needs.

2.13.4 There is currently no general consensus on the appropriate locking system for building entries, although DoD is developing a universal card system. The AR Installation should provide guidance on the type of locking system they prefer. If the facility is part of a larger Government installation, the installation may have its own criteria.

Chapter 3

General Design Considerations

3.1

Introduction

3.1.1 The purpose of this Chapter is to provide the Design Agency with general information and direction on the systems and materials applicable to all AR facilities, on the design of the site, and on the design of the various buildings. The Chapter includes some “lessons learned” by Corps of Engineers and private-sector A/E teams on previous AR projects.

3.1.2 The considerations in this Chapter are those which affect the site and landscaping, or an entire facility or building; for information on individual spaces, see Chapter 4. AR building system and material preferences are also reviewed and discussed in this Chapter.

3.2

Civil and Utilities

3.2.1 Grading and Drainage

3.2.1.1 General



Figure 3-1
ARRTC VOQ,
Ft. McCoy,
Wisconsin

3.2.1.1.1 Sites should be developed for positive drainage away from all building areas. Site drainage should be accomplished by sheet drainage, preferably over turf areas or other means of erosion control, especially adjacent to foundations. Use of on-site ditches and channels for conveyance of surface water will be minimized. Extremely flat sites on which it is not practical to establish sufficient elevation differences for overland drainage may require use of localized storm sewers and catch basins to convey storm water flow.

3.2.1.1.2 In general, all sites now require detention/retention of storm water to meet the standards of local or state water resources agencies responsible for regulation of surface water discharges; designs will comply with local requirements for release of storm water from the site. Government installations with a public works department may have adopted installation-specific drainage requirements.

3.2.1.2 Storm Water Quality and Control

3.2.1.2.1 The storm water runoff rate from the site should typically be held to its predeveloped rate, utilizing on-site detention or retention facilities. Surface ponds or depressions should be developed which are capable of storing, by detention

or retention, the required amount of water.

3.2.1.2.2 If the site to be developed has been acquired on the commercial market and is part of a larger overall development scheme, it may be part of a regional ponding system designed for storage of the incremental increase in runoff from the overall development. In such cases, the incremental runoff increase from the site will be verified with the local water resources regulatory agency to ensure that it is within the parameters of the regional pond design.

3.2.1.2.3 Underground or subterranean storm water detention facilities, or ponding in parking areas, are measures to be used only if space is not available for the construction of surface storage facilities.

3.2.1.2.4 One of the sustainable design considerations recommends that the storm water plan adopted for the site results in a 25% decrease in the rate and quantity of storm water runoff, if the existing impervious area of the site is greater than 50% of the site. This would require on-site retention, not only detention, and may not be possible in all cases.

3.2.1.2.5 Another recommended sustainable design measure is treatment systems for storm water quality to remove 80% of the average annual post-development total suspended solids and 40% of the average annual post-development total phosphorus. This is to be implemented by instituting Best Management Practices (BMPs) as outlined in EPA's "Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters" (EPA-840-B-92-002, 1143). The design methodologies for determining percent removals are generally highly empirical and no standard universal method has been adopted for this purpose. Therefore, the local governing water resources regulatory agency or water resources department of the Government installation directorate of public works will be consulted regarding acceptable design methodologies for surface water quality treatment on developing sites. These preferred local methodologies should be implemented for site design. On some facilities, the site is not provided with a positive overland drainage outlet and additional site area may be required for development of infiltration ponds sized to accommodate the incremental increase in site runoff.

3.2.1.3 Temporary Measures

3.2.1.3.1 Temporary drainage measures will be implemented to provide for erosion and sediment control according to the requirements of the National Pollutant Discharge Elimination System (NPDES) program, as implemented and enforced by the responsible state or local agencies. Each state and many local agencies have requirements for erosion and sediment control; these requirements should be obtained and implemented either as part of the construction documents or as a requirement for action by the construction contractor. The designer is typically tasked with preparing preliminary permit paperwork for completion by the construction contractor.

3.2.1.3.2 Specific temporary measures preferred by the state or local water resources regulatory agencies may need to be implemented to meet site-specific requirements. Temporary seeding and mulching of exposed areas may be required in addition to installation of specific facilities such as silt fences, sedimentation ponds, filtration beds, and riprap or slope protection. Suppression of fugitive dust from earthwork operations should also be required.

3.2.1.4 Structural Features

3.2.1.4.1 Structural features for drainage facilities will generally be constructed of reinforced concrete, and are typically available from precast concrete suppliers local to the project area. Grates and manhole covers and frames and other appurtenances will be either a durable iron casting or galvanized steel construction according to materials and items locally available. Some sites may be located in areas where the soil and water are corrosive to concrete and metal. In this case, polyethylene or other synthetic pipe and drainage structure materials may be desirable for use.

3.2.1.4.2 Incorporation of state Department of Transportation (DOT) or Government installation public works drainage structure details is advisable, since these are generally familiar to contractors, municipalities, and roadway agencies near the site.

3.2.1.4.3 Structural features will be able to withstand applied vehicle loadings in their particular Government installations.

3.2.2 Utilities

3.2.2.1 Sanitary Sewer

3.2.2.1.1 Sanitary sewers include the service pipe and structures from the building(s) to the available utility stub or connection point. The preferred pipe material for on-site sanitary sewer is PVC pipe. If extremely deep burial or heavy loads are encountered, the pipe may be installed in a steel casing or the pipe type changed to cement-lined ductile iron pipe. Sanitary sewer crossings of critical internal roadways, which should not be disturbed or open cut in the future, should be crossed using a steel casing around the sanitary sewer pipe. The pipe section and bedding should be designed to withstand the applied loads at its location.



**Figure 3-2
ARRTC VOQ,
Ft. McCoy,
Wisconsin**

3.2.2.1.2 Sanitary sewer manholes will be constructed of precast concrete with cast iron covers and frames. Clean-outs will be located at bends or changes in grade on any service line. The junction of one or more service lines and the resulting downstream sewer lateral should require a manhole.

3.2.2.1.3 Verify the capacity requirements for conveyance and treatment for the sanitary sewer utility system to which the project is connected. In general, private or municipal utility systems will represent that the downstream pipes and sewers are in serviceable condition to meet the needs of the project; the utility company maintenance and replacement program is traditionally funded by Tenant connection charges and use fees to pay for maintenance and upgrading.

3.2.2.1.4 On Government installations, where in-place sanitary sewer is to be incorporated into the project, it may be advisable to conduct a television inspection of the sanitary sewer to verify its serviceability for the proposed project. If the line is not in serviceable condition, its replacement or rehabilitation will be required. The Using Service and AR Installation will determine who is responsible for that work. Government installation public works utilities may not have implemented or budgeted for sanitary sewer utility maintenance or upgrade in all areas of the installation. Verification of the sewer serviceability, and implementation and funding of repairs is required.

3.2.2.1.5 Sanitary sewer servicing OMS/AMSA facilities and wash platform will require oil/water and grit separation. This is

accomplished by installation of separate structures within the sanitary system. Coordination with the mechanical discipline is required to determine if the separator structures are to be installed within the building footprint or outside the building.

3.2.2.1.6 Certain regions are using mechanical water and contaminant separators and the local Regional Support Command environmental and construction coordinators should be consulted.

3.2.2.2 Water Main

3.2.2.2.1 Water mains include the on-site building services for domestic and fire protection purposes from the building(s) to the water main system stub or connection point. Interior looping of the system for fire protection may be desirable.

3.2.2.2.2 Water main sizing for fire protection purposes will be based upon flow and pressure requirements for on-site hydrants and building fire suppression systems. It is recommended that the fire protection main be no smaller than 200 mm (8 in) diameter, and the standard hydrant lead no smaller than 150 mm (6 in) diameter. On-site water storage reservoirs and/or fire booster pumps may be required for sites located in areas of low system pressure.

3.2.2.2.3 Verify with local fire protection, utility and building officials whether independent domestic and fire feeds external to the building are required, or if a single feed can be separated inside the building. The requirements for indicator valves will be verified with local building and fire protection officials, or with Government installation fire departments and public works directorate.

3.2.2.2.4 In general, on-site fire protection and water supply system valves, hydrant spacing, and sizing shall be in accordance with MIL HDBK 1008C. Preferred water main pipe materials are corrosion-resistant materials such as PVC pipe, or ductile iron pipe with corrosion protection and cathodic protection, if required. Pipe sections and bedding shall be designed to withstand applied loads. Crossings of critical internal roadways, which should not be disturbed or open cut in the future, will utilize a casing around the underlying utility pipe.

3.2.2.2.5 Fire hydrant flow tests on the supplying water utility system should be conducted at the earliest practical date to determine pressures available to the project site, and whether a fire pump will be required. Many water utilities are no longer willing to release their own internal hydrant flow data due to liability concerns. In such cases, contracting with a local fire protection company or consulting engineer to conduct flow tests may be required.

3.2.2.2.6 Coordinate with the water utility to determine meter type and installation.

3.2.2.3 Natural Gas

3.2.2.3.1 The gas utilities consist of the internal gas distribution and service pipes and controls servicing the site from the building(s) to the gas utility connection point. The gas utility service industry is competitive in certain service location areas and more than one source of service may be available.

3.2.2.3.2 Gas companies normally provide some amount of service line and meter set at no charge, especially when the projected volume of gas use and resultant utility charges will justify the expenditure. Furnish estimated gas service requirements to the utility and request they examine the construction requirements and demand of the site to make a cost determination for any construction of service for the site. If longer on-site service lines are required, verify whether they are to be constructed by the utility or as part of the construction contract, and ensure that any charges to be paid to the utility are included in the contractor's requirements.

3.2.2.3.3 Many of the Government installation gas systems have been privatized; service and connection procedures are normally the same as the commercial market.

3.2.2.4 Other Utilities

3.2.2.4.1 Projects on Government installations may have access to a district heating system.

3.2.2.4.2 See Section 3.10 below for telecommunications and electric utilities.

3.2.3 Roads and Pavements

3.2.3.1 Pavement Types

3.2.3.1.1 The primary pavements and surfacings for AR sites are asphalt concrete (AC or bituminous), Portland cement concrete (PCC), and aggregate. AC is normally used for POV and MEP areas. In most areas, AC will be cheaper than PCC; however, some areas may have supply or quality control issues that favor PCC; this should be investigated for each site.

3.2.3.1.2 Tracked vehicle parking and maneuvering areas will require PCC or aggregate surfacing. Areas of high turnover of heavy equipment vehicle parking, or of concentrated vehicle turning movements and maneuvering, should receive PCC.



Figure 3-3
USARC, Camp
Parks, California

3.2.3.1.3 Other areas that normally require PCC are aprons for OMS/AMSA/DS/GS buildings, wash platforms, fueling platforms, loading dock parking and drives, and dumpster pad/pickup zones. Some access approaches, and heavily used drives or streets, may merit consideration for PCC paving. If a Mobile Kitchen Trailer (MKT) is authorized, it will require a concrete pad, preferably near the TC kitchen.

3.2.3.1.4 It is recommended to adapt pavement specifications to the state's Department of Transportation (DOT) Standard Specifications for Roadway Construction. Local pavement materials suppliers and paving contractors are likely to have state DOT certifications for material sources, screen plants, batch plants, transporters, and pavers used for pavement material production and placement.

3.2.3.1.5 AC pavement mixes should be relatively stiff to prevent wheel rutting or surface raveling during heavy use and periods of high temperatures. The state DOT highway mixes should address this situation. In some cases, the stiffer mix may have a coarser surface finish, but its strength and serviceability advantages are preferred.

3.2.3.1.6 Pavements or aggregate surfacing may require subgrade improvement measures to limit rutting or breakup over softer subgrades. Soil replacement is the preferred subgrade improvement option, but geotextiles should be considered where the improvement excavation would be deep or the area of needed improvement extensive. Obtain the

recommendations of a local geotechnical engineer or the Government installation public works department.

3.2.3.1.7 Use of recycled aggregates for base materials and pavement mix aggregates should be allowed as a recycling/sustainable design measure. State DOT specification provisions for recycled aggregate should be reviewed for restrictions or limitations on use.

3.2.3.1.8 Provide painted striping in POV and MEP areas, and elsewhere as needed.

3.2.3.2 Curb and Gutter

3.2.3.2.1 Use of curb and gutter is normally minimized for drainage, grading, and maintenance reasons. However, use of curb and gutter may be desired to channel traffic flow at access points, critical on-site intersections, or in areas in which vehicle traffic needs to be strictly separated from pedestrian traffic or parking areas. Curb and gutter are often used to define the more public or administrative areas of a facility (training center) or to protect landscaping.

3.2.3.2.2 In areas where a number of adjacent accessible parking spaces are provided, the designer should consider use of a “ribbon” type or flat curb at these accessible parking spaces, so that multiple curb ramps are eliminated. This will eliminate repetitive dips and rises in the sidewalk.

3.2.3.2.3 Any curb and gutter should be constructed of concrete. Integral curb and gutter is strongly preferred where drainage is being conveyed along the gutter. Curb-only sections may be used where drainage is directed away from the curb. Where substantial lengths of sidewalk are located along the back of the curb, consideration should be given to using an integral sidewalk/curb section.

3.2.3.3 Sidewalks and Aprons

3.2.3.3.1 Sidewalks will be provided from all building entrances to the POV and MEP areas; sidewalks in the parking areas should be avoided. Sidewalks should also be provided along natural paths through unpaved areas.

3.2.3.3.2 Sidewalks and aprons should be constructed of concrete, and should be of widths to comfortably accommodate anticipated traffic. Sidewalks immediately behind a curb at a parking area shall accommodate vehicle bumper overhang if wheel stops are not provided.

3.2.3.3.3 Sidewalk finishes should be coordinated with architectural and landscape design for special joint patterns, finishes and colors. The typical sidewalk finish should be a lightly broomed texture.

3.2.3.3.4 Special pedestrian or ramp details and finishes should be detailed on the construction drawings. Pedestrian ramp details utilized by municipalities or Government installation public works departments may be utilized for consistent appearance or for ease of construction.

3.2.3.3.5 Aprons should be sized to allow parking of at least one vehicle; the apron size will depend upon the typical vehicles for the location. Aprons at loading docks, dumpster pads and wash bay platforms shall be sized to incorporate the areas in which concentrated wheel turning movements of heavy vehicles or trucks occur and where heavy wheel loads repeatedly occur. Aprons outside maintenance shops workbays must be concrete, and 11 meters (36 ft) deep.

3.2.3.4 Additional Paving Considerations

3.2.3.4.1 Some recommended sustainable design measures are intended to reduce heat islands, including use of light-colored materials for impervious surfaces, or open grid pavement systems. Open grid modular paving units are available on the commercial market and may be investigated for use, but the availability and cost of these systems may vary widely based on locale. Practicality and serviceability of this type of system in snow areas should be carefully considered.

3.2.3.4.2 Special aggregates, toppings and coatings other than typical maintenance items (seal coatings, sealers) may be considered, but these may have high initial or maintenance costs. PCC is light in color, but usually introduces a substantial cost increase over AC pavement. Alternate pavement design, such as “resin modified pavement” may be considered for use if cost control and quality control parameters can be achieved.

3.2.4 Civil Layout

3.2.4.1 Roadway Geometrics

3.2.4.1.1 Turning radii and needed traffic clearances should be checked for adherence to the AT/FP requirements for spacing and setbacks at buildings. Consideration in design should also be given to the using vehicles from off-site sources, such as delivery trucks and maintenance or service vehicles.

3.2.4.1.2 Geometrics at the access drive will need to be coordinated with the agency responsible for the public or Government installation roadway which is being accessed. If off-site roadway improvements for access are needed, the geometrics will need to comply with the design standards of the responsible roadway agency.

3.2.4.1.3 Geometrics may be used to channel truck traffic away from POV parking areas by installing openings and radii suitable only for the POV traffic. One-way traffic and corresponding roadway geometry may be used to strictly control traffic patterns on some sites.

3.2.4.2 Slopes and Setbacks



Figure 3-4
USARC, Camp
Parks, California

3.2.4.2.1 Slopes will promote positive drainage and maintainable surfaces for landscape features. If landscaped area slopes approach 2.5 horizontal to 1.0 vertical, consideration should be given to use of low retaining walls (modular concrete wall systems are efficient for low walls of limited lengths).

3.2.4.2.2 Typical state DOT roadway slope design limitations should be met with consideration for parking and maneuvering requirements of military equipment. Much of the military equipment may be classified as all-terrain, but one of the purposes of MEP and OMS/AMSA facilities is to provide for ease of parking and maneuvering for maintenance purposes or loading for transport.

3.2.4.2.3 Setbacks shall meet AT/FP requirements and conform, if practical, to local zoning requirements or Government installation design guidance in order to be compatible with neighboring facilities and uses.

3.2.4.3 Utility Clearances

3.2.4.3.1 Utility clearances shall provide for safe long-term operation and maintenance of utilities, prevent interference of one utility with another, and meet public health or safety requirements, such as minimum separation of sanitary sewers and water mains. Special designs, such as pipe encasement, insulation or isolation may be required where utilities are closer. This may occur on sites containing in-place utilities that cannot be feasibly relocated.

3.2.4.3.2 Utility companies should be contacted for special requirements for utility separation beyond typical design values.

3.2.4.4 Driveway and Parking Layouts

3.2.4.4.1 POV parking should be arranged to minimize pedestrian traffic through rows of parked cars. The authorized area for POV parking is normally calculated to provide spaces for a maximum of 80% of Tenants on the largest drill weekend at an allowance of 29.3 sq m (35 sy) per space. Layouts must be efficient to provide the desired number of parking spaces, and 90 degree parking is preferred to 45 or 60 parking, unless site restraints dictate angled parking.

3.2.4.4.2 MEP parking may be more efficiently accommodated with a 45 or 60 degree angled parking layout due to the size of some vehicles, and the variations in sizes among the vehicles. Designer should review parking layouts with Tenants to optimize parking and maneuvering. The MEP area is based on an authorization of 41.8 sq m (50 sy) per vehicle, and generally is provided for 60% of the unit vehicles, or 10% of the vehicles supported by an AMSA. Therefore, the authorized MEP area will not typically accommodate all of the Tenants' vehicles, and some will be stored at an ECS.

3.2.4.4.3 At vehicle access driveways to kitchen, unit storage, mechanical, workbays, and similar spaces, AT/FP requirements dictate that a removable physical barrier be provided. This can be accomplished with gates, removable bollards, large chains between bollards, or similar devices. All such barriers must include locking provisions. Review with Tenants, AR Installation and Provost Marshal.

3.2.5 Fencing

3.2.5.1 Chainlink or other security fencing is always provided around the MEP area, and may be approved by the Using Service for other areas. If the budget allows, consider fencing to match the surrounding architectural character. Also consider fencing attractive nuisances such as ponding areas that will hold stormwater for appreciable lengths of time; such fencing does not necessarily have to meet physical security requirements for security fencing. Most Tenants prefer that fences are located in a strip or rock mulch or similar surfacing to avoid the need to maintain grass or plantings along the fence line.

3.2.5.2 The standard chainlink security fence is a minimum of 2140 mm (7 ft) in height, with 1830 mm of fence and three strands of barbed wire totaling 310 mm above, sloped outboard. Fences of other materials providing similar security may be considered, but should be reviewed with AR Installation security personnel to verify they meet physical security criteria. The maximum allowable distance from ground to bottom of fence is 100 mm (4 in). A “clear” area along both sides of the fence is typically required; this area generally extends for 3 meters (10 feet) on each side of the fence, but the distance should be verified with AR Installation personnel.

3.2.5.3 Vehicle gates may be swinging or rolling, based on Tenant preference, but rolling gates must maintain the maximum height above ground. It may be necessary to incorporate a “speed bump” at the gate in order to ensure the bottom of the gate does not exceed the maximum height above the paving. Powered gates are not normally provided.

3.2.5.4 Fences must be electrically grounded.

3.2.6 Wash Bays

3.2.6.1 Wash bays for military equipment may be authorized in the project documents, or requested by the Tenants for OCAR approval.

3.2.6.2 In northern locations, wash bays will normally be located within an OMS, AMSA, or DS/GS building. No additional bays will be authorized due to cost, so one or more bays must be able to be separated from the others with retractable curtains. Provide wet-service electrical systems in such bays.

3.2.6.3 In warmer climates, wash bays will normally be exterior to the maintenance building. In such cases, the designer must address collection/treatment of gray water and prevention of stormwater entry to sanitary sewers. A roofed structure or control valve system should be considered.

3.2.6.4 A concrete pad will be provided at exterior wash bays, and containment curbs or depression of the slab should be provided to control gray water. All electrical systems should be designed for wet service.

3.2.6.5 The designer should verify whether any package pressure or heating wash system will be Tenant-supplied or a part of the construction contract. If such a system is portable, it will be necessary to provide sufficient storage space to accommodate it in the maintenance shop. The designer will verify that sufficient power is provided for such systems.

3.2.6.6 Consideration should be given to recycling of gray water, possibly with a package system. Cost, sustainable design goals, and water availability will be factors in the consideration. If provided, a heated building for the equipment will be provided where climate requires.

3.2.7 Loading Ramps

3.2.7.1 Loading ramps for military equipment may be authorized in the project documents, or requested by the Tenants for OCAR approval. If so, COE has a standard design for a bi-level loading ramp that designers may wish to obtain.

3.2.7.2 Loading ramps should be adjacent to or within an MEP. Sufficient maneuvering room must be provided for both transport and loading vehicles. The necessary amount of paving may not be part of the project paving authorization or construction budget; these additional costs must be identified and approved by the Using Service.

3.2.7.3 If tracked vehicles are to be loaded, the design must provide for concrete or aggregate approaches and circulation paths to appropriate roads or parking areas.

3.3 Landscape Architecture



Figure 3-5
USARC,
Sacramento,
California

3.3.1 Quality planning and design are the basis for landscape architectural improvements that reinforce the vision, character, theme, and functional requirements of site design. Environmental conditions, sustainable design, historical context and aspects of conservation can influence the selection of materials and the design of a site.

3.3.2 Landscape design and materials must reflect an understanding of the guidelines outlined in the Department of Defense's most recent Force Protection/Antiterrorism manual. Selection of deciduous, coniferous and/or herbaceous trees, shrubs, and ground covers must be responsive to aspects of maintenance, xeriscape/irrigation concerns, year-round color and visual impact, simplicity of design and value-added benefits to be derived by landscape installation.

3.3.3 Appropriate planting design incorporates landscapes that positively modify microclimatic conditions, provides habitat for wildlife where desirable and deters unwanted fauna when appropriate. Plant material selection depends upon as found soils, plant communities and hydrological conditions. Whenever possible, efforts should be made to incorporate resource management practices, to preserve existing stands of mature landscape, and to utilize indigenous plantings and native grasses.

3.3.4 Site furnishings and related amenities need to address issues of vandal resistance, minimal maintenance, and handicapped accessibility, and should be coordinated in a manner that reflects the architecture and context in which the facility is situated. While not all-inclusive, the following site components may be considered to complement landscaping when designing outdoor spaces: facility sign, flagpoles, tables and chairs for outdoor dining, benches, trash receptacles, ash urns, bike racks, bollard posts, tree grates, appropriate mulches, fencing and trash enclosures for screening, shelters, and specialty paving surfaces for accent and focus.

3.3.5 At a minimum, lighting should be incorporated at all facilities for functional and safety/security purposes. Lighting may be building-mounted, pole-mounted or ground-mounted. Lamps for accent, ornamentation and focus, when considered, must accommodate a consistent visual character, be vandal resistant, and require minimal maintenance.

3.3.6 Signage supported by site furnishings, plant materials and lighting provides both immediate and subtle references to reinforce aspects of wayfinding at a facility. Signs serve informational, interpretive, directional, and regulatory purposes. Visual consistency, scale and clarity of organization promote a comprehensive esthetic at main entry gates, facility and building entries, parking lots and along paths and roadways.

3.3.7 Utilities and infrastructure required for support of the landscape include subsurface drainage to control hydrological aspects, water lines to address irrigation mechanical systems needs, and gas and electrical lines to supply power to site amenities that may be incorporated as part of a comprehensive site improvement package.

3.4

Fire Protection/ Life Safety

3.4.1 General

3.4.1.1 Fire protection and life safety are paramount in the design of AR facilities. Consideration should be given to exceeding requirements in certain instances. For instance, NFPA 101 allows some exit corridors in fully-sprinkled buildings to be built without one-hour ratings; the designer may wish to provide one-hour corridors based on the size of the building, number of occupants, and ease of exit.

3.4.1.2 Codes and criteria governing life safety and fire protection are (1) exiting – NFPA 101; (2) fire protection – MIL HDBK 1008C; (3) maintenance shops - NFPA 88B; and (4) construction classification/ratings – UBC. In case of conflicts, the more stringent criteria apply.

3.4.1.3 A comprehensive code analysis and a plan showing all fire protection features and systems should be developed for each project design. The analysis and plan should provide the following information:

- Type of occupancy.
- Type of construction.
- Location of fire-rated walls, doors and dampers, including those for hazardous areas.
- Exit travel distances.
- Horizontal exits.
- Exit signs and emergency lights.
- Occupant load/exit unit widths.
- Automatic extinguisher systems.
- Fire detection/alarm devices.
- Sprinklered areas (as appropriate).

3.4.1.4 If a facility authorization includes a SCIF, the SCIF will have a single controlled point of entry, most likely with an electronic lock. If necessary, a separate exit (or exits if two are required) can be provided to satisfy life safety/exiting requirements. The AR security personnel will want any such exits to include an audible alarm, and possibly a short delay, for security reasons. No hardware should be

provided on the exterior side of such exit doors.

3.4.1.5 The designer should verify that any “area of refuge” code requirements are met in multistory or very large single-story facilities.

3.4.2 Fire Sprinkler System

3.4.2.1 Fire sprinkler system design for AR projects is normally accomplished through a performance specification, with the contractor’s design engineer responsible for a detailed system design. The design criteria identified in MIL HDBK 1008C must be conveyed to the contractor’s designer in the contract documents. Note that the hose stream and remote areas for various hazard classifications are more stringent than NFPA 13 requirements.

3.4.2.2 Identify design densities for water flow and sprinkler types on a room-by-room basis so hydraulic calculations may be performed. Flow test data must be provided for the contractor to determine if the cost of oversized piping will need to be included in the bid.

3.4.2.3 In addition to MIL HDBK 1008C, other design criteria may be applicable. ETL 1110-3-446 provides thrust block design guidance. For aircraft hangar projects, ETL 1110-3-481 covers AFFF clean up requirements, ETL 1110-3-484 covers fire protection for fixed wing aircraft and ETL 1110-3-485 covers fire protection for helicopter hangars.

3.4.2.4 MIL HDBK 1008C requires that every portion of a sprinkled building be sprinkled; it does not allow exceptions for computer or electrical rooms, or arms vaults.

3.4.3 Fire Alarm System

3.4.3.1 An addressable Class B fire alarm system will be provided, consisting of manual break glass stations at exits, combination horn/visual signals located in accordance with ADA requirements, duct smoke detectors in air-handling units as required by code, and magnetic hold-open devices with smoke detectors for corridor fire doors. The system should be addressable, zoned, noncoded and fully supervised.

3.4.3.2 A fire alarm riser diagram will be provided in the construction documents. The control panel should be fed from a panelboard to provide 120V, 1-phase, 2-wire plus ground to the control panel.

3.4.3.3 A remote annunciator panel should be installed at an entrance designated by the Tenant.

3.4.3.4 Any kitchen equipment below hoods must be shut down upon activation of the kitchen fire suppression system.

3.4.3.5 Photoelectric smoke detectors should be included in electrical, telephone and network/IT rooms.

3.4.3.6 All water flow switches, tamper switches and post indicator valves should be connected to the fire alarm panel.

3.4.3.7 All conduits for fire alarm system should be 16 mm minimum.

3.4.3.8 Remote station signal transmitter should be provided with a digital alarm communicator capable of transmitting alarm and trouble signals over telephone lines (telephone dialer) or radio transmitter to a remote security monitoring stations/base fire department. Verification of current practices for fire alarm signal monitoring at the existing base/site is necessary.

3.5 Architectural

3.5.1 AR/MDS Approved Systems and Materials

3.5.1.1 AR, through the development of its MDS system, has established some preferred systems and materials for the design and construction of AR facilities. When practical, AR preference is that these systems and materials be used for all AR facilities, whether designed with MDS or not. Recommendations for departures from these systems and materials should be reviewed with the Using Service.

3.5.1.2 The preferred exterior wall construction is an insulated cavity wall of brick or CMU veneer with masonry or steel stud backup. Metal panels are an alternative to the masonry veneer. The interior finish of the exterior wall will be gypsum board over furring or steel studs in finished spaces, and painted CMU in more utilitarian areas.

3.5.1.3 Preferred exterior doors are hollow metal in hollow metal frames, with aluminum doors in aluminum storefront systems for major entries. Exterior windows should be steel or aluminum frame units, or storefront assemblies where large areas of glazing are desired.

3.5.1.4 The preferred roof construction is a sloped standing seam metal roof, except at the kitchen, where a low-slope ("flat") roof

better accommodates the kitchen equipment rooftop penetrations and equipment. See guidance on standing seam metal roof systems (SSMRS) in Appendix K. Low slope roofs are an acceptable design solution when the Using Agency and AR Installation approve, or where budget limitations dictate. Modified bitumen or single-ply membrane roofing will be used for low-slope roofs.

3.5.1.5 Preferred interior walls are steel stud with gypsum board for spaces where a more pleasant finish is desired, or CMU. CMU walls may be painted, burnished or glazed. Consideration should be given to space function and volume of traffic; in high traffic areas and areas where wear and tear can be anticipated, it may be desirable to use burnished or glazed CMU if a nicer finish is desired. It may be helpful to consider wear and tear in an AR training center to be similar to that anticipated in a high school or college building, and use in an OMS to be similar to a repair garage.

3.5.1.6 Interior doors should be either solid-core wood or hollow metal in hollow metal frames. Offices and similar spaces with higher levels of finish should receive wood doors; more utilitarian areas can utilize hollow metal doors. The arms vault door must be a Class V rated door. Doors must be a minimum of 900 mm (3 feet) in width.



Figure 3-6
AFRC, Greenville,
North Carolina

3.5.1.7 Most spaces with ceilings will be suspended acoustical tile; the AR preference is for 600 mm by 600 mm (24 inch by 24 inch) tiles to avoid sagging of tiles. Areas where higher humidity is anticipated should receive a suspended gypsum board ceiling. Ceilings for kitchen and shower areas will be suspended cement board with joint compound skim coat.

3.5.1.8 In general, the materials and methods of construction proposed for use on AR facilities should be of high quality and will have been used (preferably by the Design Agency) in several projects which can be researched to ascertain the product's performance characteristics. Materials, as well as the design, should be of good quality and able to stand the test of time.

3.5.2 Image/Esthetics

3.5.2.1 Both the exterior and the interior image of AR facilities should reflect military values, such as dignity, tradition, discipline and order. At the same time, they should provide the Tenants a functional and comfortable workplace, and an atmosphere which will promote feelings of pride and ownership.

3.5.2.2 The AR is seeking a level of standardization in their built facilities, but are not seeking “cookie-cutter” design solutions. Many of the spaces and features of the facilities will be the same throughout the AR system, and design efficiencies can be gained through reuse of standard space modules or groupings. However, the Design Agency should seek to give each project its own identity, based on Tenant input and local/regional influences.

3.5.2.3 The level of finish and detail in a training center should be one that would be appropriate for an office building of good quality, with additional emphasis on durability and maintainability. For an OMS or AMSA building, finish and detail can be more utilitarian in the maintenance areas, but similar to a training center in the office areas.

3.5.2.4 Each AR facility will have two “Minuteman” plaques, one for exterior display and one for interior display; the exterior plaque should be located with the “U.S. Army Reserve Training Center” signage. These should be in locations of maximum visibility. Consideration should be given to developing high-visibility locations for the Tenants to display their trophies and other memorabilia. In centers housing more than one unit, individual locations may be appropriate.

3.5.2.5 Consider protective continuous bumper moldings and corner guards for corridors and other high traffic areas to minimize damage to walls. The continuous bumpers may be required at both base and chair rail height, depending on the type of delivery carts anticipated to be used in the facility.

3.5.3 Room Numbering

3.5.3.1 The Design Agency should work with the AR Installation to develop a room numbering scheme for the construction documents that will also be functional for the later operation and maintenance of the facility.

3.5.3.2 Consider numbering larger buildings by wings, i.e., S104, W236. Consider using letters, rather than numbers, for stairs, corridors and similar spaces; the Tenants and maintenance personnel rarely think of these spaces as rooms, and giving them room numbers can be confusing.

3.5.4 Stairs and Elevators

3.5.4.1 Typical stairs are concrete-filled metal pan construction, unless a monumental stair is part of the design. AR prefers wire mesh infill panels for open stair and landing rails. All stairs, including fire stairs, should be nicely detailed and finished, in keeping with finishes in the rest of the project.

3.5.4.2 Elevators should meet accessibility requirements, and elevator hooks and pads should be specified for occasional moving of furniture.

3.5.4.3 Elevator Power Supply: Refer to Section 3.9 below.

3.5.5 Doors and Windows



Figure 3-7
ARRTC VOQ,
Ft. McCoy,
Wisconsin

3.5.5.1 Windows should be located where functionally appropriate and as an element of sustainable design for daylighting purposes. Consider the use of operable windows, with screens, for administrative and similar areas, for sustainable design reasons and to provide ventilation flexibility. Provide blinds or exterior shading to minimize glare.

3.5.5.2 Daylighting strategies should be considered for the unit or administrative common areas, corridors, assembly hall, lobby and unit storage area. Due to security concerns, unit storage daylighting may require clerestory glazing or glazed block.

3.5.5.3 Coordinate with the AR Installation to develop appropriate door hardware and keying. There are security restrictions prohibiting master key systems; the designer should review keying requirements with AR Installation security personnel. Weapons areas, storage areas, and secure spaces, at a minimum, will not be part of any master key system.

3.5.5.4 Doors in office and similar administrative or educational areas are typically solid-core wood; doors in more utilitarian areas may be hollow metal. Doors to administrative areas may have lights or sidelights for sustainable design purposes, and to provide visibility for the Tenants and a view into the space from the corridors. Doors to individual offices should not require closers or kickplates.

3.5.6 Caging and Shelving

3.5.6.1 Woven welded wire fabric cages are generally required in storage areas such as unit storage, arms vault, tools storage, parts storage and unheated storage buildings to provide individual units the ability to secure their equipment. Wire caging on a 1225 mm (4 ft) module is standard. The partitions will be 10-gauge steel wire panels woven into 40 mm by 3 mm (1-1/2 in by 1/8 in) channels. Framing should be provided at framing at pipes, ducts and other obstructions running through the partition.

3.5.6.2 The Tenants may wish to combine one or more typical cages into a larger cage, or simply provide one or more large caged areas depending on their equipment storage needs.

3.5.6.3 The typical size of a unit storage cage is 2500 mm by 3750 mm (8 ft by 12 ft). Doors may be sliding, single swing, or bi-parting, providing a clear opening in one of the narrow ends of the cage of 1220 mm by 2450 mm (4 ft by 8 ft). Caging should be installed from the floor to the roof deck or floor slab above. Where this is impractical, provide woven welded wire fabric ceilings.

3.5.6.4 Cages for arms vault, tools and parts storage and other storage areas may be the same 2500 mm by 3750 mm module as the basic unit storage cage, or may be tailored to the Tenants' requirements.

3.5.6.5 Security is a key element of the design of cages. The cage frames should be no more than 25 mm (1 in) from the floor, and all bolted cage frame connectors should be tack welded in place or have tamper-proof nuts. Doors should fit tightly in their frames and where they meet. Doors should be provided with two padlock hasps at third points; the padlocks should be specified with other door hardware. Some Tenants prefer a few cages with Dutch doors; security personnel may think these require six padlocks. No opening in caging or a caged area shall exceed 60,000 sq mm (96 sq in); the least dimension shall not exceed 150 mm (6 in). This includes spaces in the building structure when the caging is extended to the structure, including web spaces of bar joists.

3.5.6.6 Shelving for the unit storage caged areas is heavy-duty open steel shelving units with five adjustable shelves. The units are typically 1200 mm wide, 600 mm deep and 2000 mm tall (4 ft by 2 ft by 7 ft). Shelving for maintenance shop tool and parts storage cages is the same width and height, but 450 mm (18 in) deep. The units may be

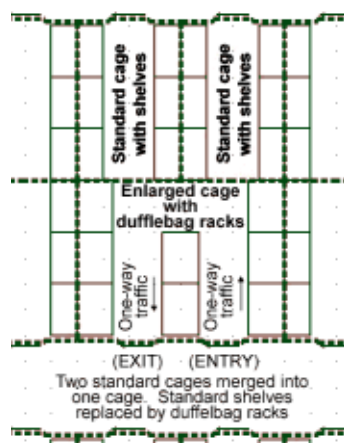


Figure 3-8
Duffelbag Cage Layout

wider than their nominal width, and the Design Agency must ensure that the typical cages are of sufficient size to accommodate three units end to end. A minimum of 6 units per typical cage is normally provided, 3 along each side, but Tenants should be asked for their shelving layout preference..

3.5.6.7 Some units want cages and shelving specifically designed to accommodate storage of their duffel bags in the unit storage area. Shelving for duffelbags is 840 mm (33 in) deep; a typical 2500 mm by 3750 mm cage cannot provide a sufficient aisle if shelving units are placed along each of the long walls. Combine two of the typical cages side by side, and provide 3 shelving units along each 3750 mm side, and 2 shelving units in the middle of the cage. By providing two doors in the 5000 mm side, the soldiers can enter one door, walk through the cage to pick up or replace their duffel bags, and exit the other door. Each shelving unit will accommodate 15 duffel bags, so one such cage will accommodate 120. At two bags per soldier, one cage serves 60 soldiers.

3.6 Interior Design

3.6.1 MDS/AR Approved Materials and Systems

3.6.1.1 The approved finish materials for the various spaces are described, by space, in Chapter 4. A list of approved furnishings for each space is also located there.

3.6.1.2 Flooring

3.6.1.2.1 Vinyl composition tile (VCT) is the preferred flooring in most rooms for reasons of economy, durability, ease of maintenance and resistance to stains.

3.6.1.2.2 In areas where an upgraded appearance is desired, carpeting is the normal option. Carpet also aids in noise reduction and reduces fatigue when standing for long periods. Fiber, construction, and cleanability must be considered in selection of carpet. Carpet tile is preferred, but roll goods in 1800 mm (6 ft) width may also be considered. While roll goods are typically less expensive, tiles are more easily maintained and require replacement only of damaged portions.

3.6.1.2.3 Certain areas of the building may require specialty floorings. In restrooms, ceramic tile is normally used because of its hard surface, ease of cleaning, and stain resistance. In the kitchen, quarry tile is used because it is impervious to water,

grease and most liquids. In physical fitness rooms, rubber flooring is used for resilience and resistance to indentation. In NOC rooms and other rooms where electrical equipment is in use, a static dissipative tile is used to reduce the effects of static electricity.



Figure 3-9
USARC, Camp
Parks, California

3.6.1.2.4 Other flooring materials such as ceramic or quarry tile are occasionally used when an upgraded image is desired or to complement the facility image.

3.6.1.2.5 Recessed walk-off mats or entrance-type carpeting should be provided at all major training center entrances to minimize tracking of dirt, mud and snow into the building.

3.6.1.3 Wall Finishes

3.6.1.3.1 Paint is the preferred finish for wall surfaces. The paints used in the facility should be high quality, durable and easily cleaned. Epoxy paint should be used in wet areas such as toilet rooms.

3.6.1.3.2 Ceramic tile is used on the walls of toilet and shower rooms for durability, cleanability and resistance to stains.

3.6.1.3.3 For areas where enhanced appearance is desired, such as conference rooms and command suites, vinyl wallcovering or paneling should be considered.

3.6.1.3.4 Horizontal or vertical blinds are provided for most windows. Room-darkening shades are required in classrooms, conference rooms, and other areas where A/V equipment might be used.

3.6.2 Furniture

3.6.2.1 Furniture for AR projects is normally provided by Federal Prison Industries (FPI)/UNICOR, but some projects are implemented under the UNICOR Select Furniture Program, which allows for choices among GSA furniture vendors. The designer must verify with the Using Service whether UNICOR furniture will be used, and, if not, may be required to perform a competition study to identify GSA vendors for the project. The same GSA vendor will provide all panel- and desk-based furniture. In projects with GSA furniture, some UNICOR products, such as seating, may also be used. Incidental items such as wall-mounted coat racks or coat trees may

be provided by open-market vendors.

3.6.2.2 The majority of the furniture in AR facilities is administrative, and will be either freestanding metal desk-based furniture or panel-based system furniture. The AR has determined that suspended pedestals will not be used. Furniture should be coordinated with the Tenants so that it supports the intended functions and equipment.

3.6.2.2.1 Freestanding metal desk-based furniture is used in the private and shared offices. The desk-based furniture will be capable of structurally supporting overhead desk storage. AR has selected freestanding metal desk-based furniture for offices for its greater flexibility and minimal effort when changes are required. The supports for the overhead desk storage should not exceed approximately 150 mm (6 in) in depth. Avoid furniture arrangements which has office Tenant's back to the door.

3.6.2.2.2 Panel-based system furniture is used in the unit common areas. All of the major components (work surfaces, overheads, etc.) of the system will be suspended or hung from the panels. The panels provide some acoustical and visual privacy in the open office spaces. The panels are typically powered with an eight (8) wire system.

3.6.2.2.3 Traditional wood furniture is used in command offices and command suites.

3.6.2.2.4 Workstation and common-use storage pieces should be provided with keyed locks; coordinate keying with Tenants. Normally, the storage pieces in each private office workstation should be keyed alike; unit commons workstation storage may require more than one key per workstation due to multiple Tenants.

3.6.2.3 Seating

3.6.2.3.1 Desk seating for the private, shared and unit common workstations will have ergonomic adjustments to fit the Tenant and the task. Ergonomic adjustments include overall height, lumbar support and arm height adjustments which help the Tenant to more efficiently complete the task and prevent injury.

3.6.2.3.2 Visitor or guest chairs will be sled-based to easily be pulled up to the desk or table.

3.6.2.3.3 Classroom chairs will be stackable to make the room easy to reconfigure as well as for ease of storage.

3.6.2.3.4 Breakroom chairs will have plastic shell seats or be vinyl covered for ease in cleaning.

3.6.2.3.5 Lounge seating will be fully upholstered.

3.6.2.3.6 Adjustable stools are used in conjunction with lecterns in classrooms, and at counters in mailrooms and administrative support spaces. Adjustable stools used with workbenches in armorers' room and repair rooms will have vinyl upholstery with a finish that will protect against grease and oils.

3.6.3 Colors: The AR has approved four basic color schemes for its MDS system projects: green, blue, rust and cranberry. These color schemes serve as a guideline and the designer is encouraged to enhance them.

3.6.4 Steel shelving, steel cabinets and workbenches for unit storage areas, maintenance shops, and armorers' rooms are considered equipment rather than furniture, and are provided as part of the construction contract under OMAR funding. (See Appendix B for list of OMAR-funded items.) Shelving for library and facility maintenance area is typically part of the furniture package.

3.6.5 Furniture design must be closely coordinated with electrical and communication design; this is especially true for the open office workstations. The workstations will be furnished and installed by the Government, but the construction contractor will be responsible for wiring them once they are installed. Close coordination should reduce the conflict inherent in this situation.

3.6.6 The RSC and Tenants should be asked if they have furniture standards of their own. In case of conflicts with typical AR standards, the Using Service will make a determination.

3.7 Structural

3.7.1 MDS/AR Approved Systems and Materials

3.7.1.1 Reference TI 800-01 “Design Criteria” for further structural design information.

3.7.1.2 The structural system should be the most cost effective design without restricting the architectural and engineering aspects of the building, such as flexibility, function, character, and symmetrical configuration for seismic resistance. A variety of systems should be considered, and the one selected must satisfy the site, flexibility, future expansion, program, economic and availability requirements. Note: availability of hard metric construction materials plays a significant role in the structural design.

3.7.1.3 The following are typical structural framing systems preferred by AR.

3.7.1.3.1 Exterior walls will be concrete masonry or steel studs with a masonry veneer. Concrete masonry is preferred due to durability and stiffness for masonry veneer backup. If studs are considered for masonry veneer backup, design should limit stud lateral deflection to $L/600$. AT/FP requirements restrict the use of load-bearing concrete masonry and load bearing steel stud walls for multistory structures (three stories or more, not including the basement, if applicable).

3.7.1.3.2 Roof framing consists of steel beams, steel bar joists, and steel roof deck. Depending on local soil conditions, the lower level floor is reinforced concrete slab on grade or structurally reinforced concrete slab. The remaining levels consist of either steel form deck filled with concrete supported by steel bar joists, steel beams and columns or precast plank supported on load-bearing concrete masonry walls. Depending on requirements for fireproofing, composite steel beams may be an alternative to steel bar joists in the above-mentioned systems. Consider pre-engineered buildings for unheated storage structures. AR strongly prefers tube columns for ease of detailing and fit within exterior walls.

3.7.2 Design Loads

3.7.2.1 The following are minimum design loads. Some local building codes or design requirements may be more stringent and will take precedence.

3.7.2.2 Gravity Loads

Roof live load	1.0 kPA (20 psf)
Snow load (governs if greater than the minimum Roof live load of 1.0 kPA above)	refer to TI 809-01

Floor live loads (in accordance with ASCE 7)

Assembly/waiting rooms	4.8 kPA (100 psf)
Classrooms	1.9 kPA (40 psf)
Corridors (2nd floor)	3.8 kPA (80 psf)
Day rooms/lounge	2.9 kPA (60 psf)
Latrines/locker rooms	3.6 kPA (75 psf)
Library/reading rooms	2.9 kPA (60 psf)
Light storage	6.0 kPA (125 psf)
Mechanical room (air conditioning)	6.0 kPA (125 psf)
Mech. equip. room (general)	4.8 kPA (100 psf)
Offices	2.4 kPA (50 psf)
Recreation rooms	4.8 kPA (100 psf)
Telephone/radio equip. rooms	7.2 kPA (150 psf)

Floor partition load	1.0 kPA (20 psf)
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3.7.2.3 Some Tenants have concentrated loads in the form of banks of files or safes; the designer should inquire as to whether there are special loads which need to be accommodated in the design.

3.7.3 Lateral Design

3.7.3.1 Seismic lateral loads are determined according to TI 809-04 “Seismic Design for Buildings”. A geotechnical engineer should determine the seismic Site Classification during the site evaluation and prior to the project feasibility study.

3.7.3.2 Wind lateral loads are determined according to ASCE 7-95 “Minimum Design Loads for Buildings”. Basic wind speeds are found in TI 809-01 “Load Assumptions for Buildings”. An Importance Factor of 1.0 should be applied to the design of training centers.

3.7.3.3 Wind pressures (components and cladding) on roof systems should be shown on construction documents. Structural should determine cladding wind pressure values and information could be shown on architectural roof plans.

3.7.3.4 Provide redundant lateral resisting systems to comply with AT/FP requirements. Refer to Section 3.7.6 for further information.

3.7.4 Structural Ceiling Grid System: Below the sloped roof, provide a U-shaped cold-formed channel grid system for ceiling, mechanical/electrical equipment support and lateral support of nonload-bearing partition walls. Grid system should be laterally braced for site-specific seismic conditions. Minimum lateral design load will be 0.25 kPa (5 psf) applied to supported elements.

3.7.5 Wall Elevations

3.7.5.1 Structural wall elevations will be provided in the construction (drawings) documents. Concrete masonry wall elevations will note the reinforcing steel, steel or masonry lintels and other pertinent information. Wall elevations should show dimensions of all architectural and mechanical wall openings.

3.7.5.2 Structural may consider a key plan (building footprint) for referencing wall elevations.

3.7.6 Antiterrorism/Force Protection (AT/FP) Considerations

3.7.6.1 Refer to Section 2.5 of this document for AT/FP documentation and further information. The AR prefers that buildings be limited to two stories to avoid additional construction costs necessitated by buildings over two stories in height.

3.7.6.2 A brief summary of some structural requirements:

3.7.6.2.1 For all multistory (three or more stories, not including the basement, if applicable) inhabited structures, design all vertical load bearing elements assuming the loss of lateral support at any one floor level. For design of vertical elements, the effective length is established by lateral support by the roof or floor level(s). This will essentially double the design effective length of the column, and thus possibly increase its size. The design of the vertical element should include the load contribution from the lost level. This requirement is independent of standoff distances.

3.7.6.2.2 Exterior masonry walls will be reinforced in all inhabited structures. Refer to AT/FP criteria for minimum masonry reinforcing. When AT/FP standoff distances are not met, grouting and vertical reinforcing may need to be increased to resist the damage of an explosive placed at the standoff distance.

3.7.6.2.3 On multistory (three or more stories, not including the basement, if applicable) inhabited structures, design all floors and roofs with improved capacity to withstand load reversals. This requirement is independent of standoff distances.

3.7.6.2.4 AT/FP requirements restrict the use of load bearing concrete masonry and load bearing steel stud walls for multistory structures (three stories or more, not including the basement, if applicable). Exterior walls in multistory inhabited structures will employ one-way wall elements spanning vertically to minimize blast loads on columns. AT/FP requires that concrete masonry walls span vertically and be isolated from vertical elements (i.e., columns) of the frame system. This requirement is independent of standoff distances.

3.7.6.2.5 When portions of inhabited structures with lesser occupancies are located within prescribed standoff distances, structurally separate those portions of lesser occupancy from the remaining portions of the structure that meet the standoff distances. Individual structural framing systems may be utilized, for example, locating two columns side by side to support neighboring portions of inhabited structures. Coordinate standoff distance requirements with project site designer.

3.7.6.2.6 Attach interior ceiling-mounted fixtures to the supporting structural system in inhabited structures. This includes suspended ceilings, light fixtures, and mechanical and electrical ducting and pipes. Seismic support of these items is described in TI 809-04 “Seismic Design for Buildings”. This requirement is independent of standoff distances.

3.7.7 Foundation

3.7.7.1 Concrete masonry foundation walls below grade will be filled solid with corefill concrete to prevent water from accumulating.

3.7.7.2 Provide a typical foundation and ground floor slab detail within the construction (drawing) documents. This detail will note the geotechnical soils report recommendations for preparation of soils to support the building foundation and concrete slab.

3.7.8 Renovations/Alterations

3.7.8.1 Refer to TI 809-05 “Seismic Evaluation and Rehabilitation for Buildings” & TI 809-51 “Seismic Review Procedures for Military

Buildings” for seismic evaluation and upgrading of existing structures.

3.7.8.2 When altering an existing structure, consult the Using Service (OCAR) for extents of structural upgrading for current code compliance and life safety requirements.

3.7.8.3 In addition to structural design criteria, the seismic capability of existing structures must be evaluated. The analysis should be implemented as follows:

3.7.8.3.1 The seismic evaluation analysis will be carried to the extent necessary to determine a reasonable estimate of the life safety requirement (safety of personnel, i.e., to prevent collapse of building). Where complete design data and as-built drawings are not available, investigation of the structure will be made as necessary to perform the life safety evaluation and will be based on the following parameters.

3.7.8.3.2 Calculations will ordinarily be limited to the analysis of representative frames or load-bearing shear walls in both directions of the structure. Seismic forces will be carried to the foundations.

3.7.8.3.3 Consult the Using Service (OCAR) regarding lateral resisting systems redundancy according to AT/FP guidelines.

3.7.8.3.4 Roof and floor diaphragms will be investigated to transfer the lateral load to the frames or shear walls, particularly the connections.

3.7.8.3.5 Nonreinforced masonry filler walls will be assumed to have no resistance capacity and will be susceptible to damage. However, if there are many of these walls that appear to provide substantial lateral load restraint without exceeding the allowable stresses, they may be considered as part of the seismic resisting system.

3.7.8.3.6 When the strength of materials in concrete construction or the strength of the load-bearing masonry walls is critical for the investigation or in determining the necessary remedial measures, core samples will be taken and tested to determine the values to be used for developing the conclusions.

3.7.8.3.7 Life safety of the existing structure is defined as meeting 80 percent of the lateral resistance (strength



Figure 3-10
USARC, Arden Hills,
Minnesota

requirements) required by code. However, any strengthening or remedial measures to be provided will be designed to meet 100 percent of the lateral resistance of the code.

3.7.8.3.8 Refer to TI 809-05 “Seismic Evaluation and Rehabilitation for Buildings” for detailed requirements for ductility in frames, connections to account for walls, isolation of nonstructural masonry walls, clearances to account for story drift and support of nonstructural and mechanical/electrical elements. Existing partitions and walls without lateral support at the top, or without straying from a relatively rigid ceiling system near the top, will be provided with lateral support against seismic forces. Mechanical and electrical equipment will be anchored to resist seismic forces. All new partitions, suspended ceilings, mechanical and electrical elements, and systems must be designed in accordance with TI 809-04 “Seismic Design for Buildings” requirements.

3.8 Mechanical

3.8.1 MDS/AR Approved Materials and Systems

3.8.1.1 HVAC materials are of commercial quality, leaning towards the industrial end of the scale. In most cases equipment is floor-mounted in a mechanical room or installed outside on a housekeeping pad. Rooftop equipment is seldom used except for kitchen applications. NOC rooms should be served by small split system cooling units to allow the central cooling plant to be deactivated in the unoccupied mode. HVAC systems and equipment should be selected to provide the lowest life cycle cost. Refer to ETL 1110-1-181 for chiller selections. When selecting equipment and systems, consideration should also be given to keeping the service aspects of the installation simple, allowing on-site personnel to perform the maintenance tasks rather than having outside service contracts. There are five general HVAC system types used on MDS projects in which the software will place the equipment items.

3.8.1.1.1 Variable Air Volume Systems include a central package air handler which utilizes chilled water, and hot water coils, package chiller and boilers, and VAV boxes with reheat. If a chilled water system cannot be justified by life cycle costs, air-cooled condensing units may be used.

3.8.1.1.2 Split Systems include fuel-fired furnaces with condensing units or small air handlers with condensing unit/heat pumps. These are normally single zone units.

3.8.1.1.3 Fan Coil Units Systems can be used for multizone situations in lieu of VAV boxes. This system requires central chiller and boilers and piping systems feeding the fan coil units in each zone.

3.8.1.1.4 Vehicle maintenance bays are normally served by either fuel-fired infrared heaters or fuel-fired forced air unit heaters. In climates with more than 5000 heating degree days, in-floor hot water heat is the standard.

3.8.1.1.5 Kitchens are normally served by a rooftop makeup air unit and cooled by either a packaged cooling rooftop unit or by a central VAV system.

3.8.1.2 It is standard practice to apply DDC controls to Army Reserve building projects. The size of the projects are generally such that digital controls are warranted for energy savings. Single Loop Digital Controls (SLDC) must be used when on-Post, and when future connection to EMCS/UMCS systems is planned. Off-Post facilities, buildings not intended to be connected to EMCS, and facilities where the Tenant specifically directs the design, are facilities where DDC is permitted to be used and must be decided on a case-by-case basis. MDS utilizes a generic specification which describes performance as well as product requirements.

3.8.1.3 Typical Design Parameters: Refer to Chapter 4 for indoor design conditions for occupied and unoccupied spaces. Refer to TM-5-785 for outdoor design conditions. Use 2.5% design criteria for cooling and 97.5% design criteria for heating. Select and design mechanical systems in accordance with TI810-10, ASHRAE 62, and Chapters 11 and 13 of TI 800-01. Use mechanical ventilation to meet the building's cooling requirements when practical. Consider the use of heat recovery equipment in areas with high ventilation requirements. Comply with the latest ASHRAE energy efficiency standard (90.1) when specifying and scheduling fuel-fired equipment, motors and dampers. Size pipes and ducts using industry standard friction rates and velocities. Design ducts and piping with smooth transitions to reduce friction losses. Specify insulation thicknesses to meet applicable energy efficiency standards. Comply with Chapter 10 of TI-809-04 in areas subject to seismic events. TM-5-805-4 provides design guidance for controlling noise and vibration.

3.8.2 Provide mechanical ventilation that allows the buildings to conform to sustainable design standards indicated in ETL 1110-3-491. This includes applying ASHRAE standard 62-1999. Heat recovery techniques may be

applied to reduce energy consumption, as determined by life cycle cost analysis. Refer to 10 CFR 436 for life cycle cost methodology, and utilize information from TM 5-802-1 Economic Studies, NBSIR 85-3273-2, and OMB Circular No. A-94 Appendix C. The Federal Energy Management Program is in place to reduce cost for the Federal Government by advancing energy efficiency. Recovering heat from exhaust air is a proven technology that may be applied to large buildings and maintenance facilities with substantial exhaust requirements. For maximum cost effectiveness, these strategies need to be considered and incorporated into the design prior to the interim design (35%) submittal.

3.8.3 Provide automatic temperature controls for maintaining occupied and unoccupied temperature conditions. Use temperature controls with setback and time-of-day provisions that allow building temperatures to drift during unoccupied hours. Provide protective shields for sensors and thermostats in exposed areas. Apply DDC (direct digital controls) to VAV (variable air volume) and other multiple zone systems used on larger (over 1000 sq m) buildings. Provide an emergency HVAC shutoff switch accessible to building occupants that will shut down air handling systems to limit distribution of airborne contaminants.

3.8.4 Zoning and System Considerations: emphasize the occupancy profile for various areas of the building when analyzing systems. Where possible, isolate part-time occupancy areas from full-time occupancy areas to reduce energy consumption. Allow unoccupied zones to drift to the unoccupied space temperature limits. Make provisions to introduce mechanically conditioned ventilation air only during the occupied hours for each zone. Ventilation requirements listed in individual space criteria are minimums. Humidification systems are not required. Dedicated dehumidification systems are required only in arms storage vaults. Base additional design decisions on the recommendations stated in the latest editions of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Guide and Data Book.

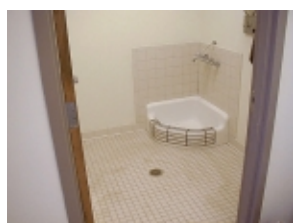
3.8.5 Provide dedicated mechanical room space for floor-mounted equipment. Include adequate space for the equipment, duct and piping connections, removal and replacement access, and manufacturer's recommended service clearances around each piece of equipment. Equipment may share service access space to minimize mechanical room floor area. Isolate natural draft fuel-fired equipment from air-handling equipment to prevent downdrafting of flue gases. Ventilation air intakes and exhaust air intakes must be a minimum of 9.1 meters (30 feet) apart, and be on a different building face. Intakes must also be as far as possible from cooling towers, plumbing vents and any other source of contamination.

3.8.6 Consider providing screen walls for exterior mechanical or electrical equipment, to screen them from view to improve the appearance of the facility. If screen walls are provided, their design must comply with AT/FP standards. Typical screen walls are 2450 mm (8 ft) tall, of a solid material with a lockable gate, and the screened area normally has a rock mulch or similar ground cover. It may be necessary to provide a screen top to the enclosure for AT/FP purposes.

3.9 Plumbing

3.9.1 MDS/AR Approved Materials and Systems

3.9.1.1 The plumbing materials are those typically used for commercial construction where the building owner intends to occupy the building. The MDS program includes the application of a compressed air piping system for maintenance bay service tools. Other options may include hard piped lube/oil and AT fluid distribution systems, compressed air drops, battery charging, emergency safety fixtures and water drops. These may be shared by adjacent workbays to reduce cost.



**Figure 3-11
Janitor's Closet**

3.9.1.2 Provide factory fabricated plumbing equipment. This includes grease traps, oil/water separators, compressed air plants and trench drains. Select piping materials that will provide 25 years of service. Consider the durability required to withstand periodic and emergency cleaning with plumbing snakes. Select plumbing fixtures and equipment to provide the lowest life cycle cost. Refer to ETL 1110-3-465 for water meter criteria. Refer to ETL 1110-3-466 for selection of oil/water separators. TM 5-810-4, 5 and 6 provide design guidance for compressed air, plumbing and gas piping systems, respectively. TM 5-813-5 provides design guidance for water supply systems. Communication with the Tenants is important to establish the appropriate level of design for the vehicle maintenance areas.

3.10 Electrical

3.10.1 General

3.10.1.1 The primary goal of electrical systems design should be to provide a safe, reliable, flexible, economical, comfortable and energy efficient facility.

3.10.1.2 The project design should include power distribution, interior and exterior lighting, exit and egress lighting, fire alarm system, fire alarm signal transmitters, security system, arms vault intrusion detection system, public address system, cathodic protection, lightning protection, open office furniture wiring, kitchen equipment wiring,

elevator equipment wiring, and telecommunication system.

3.10.1.3 Electrical and communication design must be closely coordinated with furniture design; this is especially true for the open office workstations. The workstations will be furnished and installed by the Government, but the construction contractor will be responsible for wiring them once they are installed. Close coordination should reduce the conflict inherent in this situation.

3.10.1.4 The design and construction of the electrical systems should be in compliance with the latest NFPA-70-National Electrical Code, NFPA-101- Life Safety Code, IES Lighting Reference Guide and Application Guide, EIA/TIA 568A and 569, and MIL HDBK 1012/3 standards.

3.10.1.5 The materials should be specified in accordance with the standards above. The specifications should include testing and commissioning of all electrical systems.

3.10.1.6 The designer should prepare lighting calculations, electrical load calculations, electrical short circuit and protective device coordination analysis and calculations. The short circuit and protective device coordination analysis should be done using industry standard computer software and the reports should be furnished for Government review.

3.10.2 Exterior Electrical Systems

3.10.2.1 The main electric power service will be obtained from the local power company or the Government installation.

3.10.2.2 A/E should confirm in writing the service requirements from the utility or installation to provide primary underground electrical service and pad-mounted transformer. Pad-mounted transformer should be located a minimum of 3 meters from building noncombustible wall and as required by the power company or installation.

3.10.2.3 Provide empty conduits from the service transformers to the primary power source for service cables. The transformer pad will typically be provided by the contractor in accordance with utility company standards. Secondary underground electrical service, including trenching and backfilling, should be provided by the contractor. Provide current transformer (CT) cabinet for utility-furnished CTs. Utility company normally provides meter. A 21 mm conduit should be routed from the CT cabinet to the meter.

3.10.2.4 Secondary underground electrical service should be direct burial conduits, with a spare conduit from the transformer to the main switchboard.

3.10.2.5 Exterior sign should be lighted. Flagpole should be lighted if it is determined that flag will not be removed at night.

3.10.2.6 Exterior lighting fixtures (wallpacks, canopy lights) should be provided at building entrances/exit doors with programmable lighting control system and a photocell. Control should be photo on/photo off. Locate the lighting controller and time clocks in the main electrical room.

3.10.2.7 DEPMED and MEP area should be provided with light fixtures mounted on 9.1 meter steel pole for area lighting. Consider the use of bi-level 400 watt high pressure sodium lamp light fixtures with motion sensors for exterior lighting to turn on light fixtures to full brightness when a motion is detected in the area. The light fixtures should operate at a lower light level when the area is not occupied. Locate the lighting controller and time clocks in the main electrical room. Maintain an average lighting level of one foot-candle throughout the areas.

3.10.2.8 Verify the need for security lighting for POV parking area with the Tenants and also the local municipality or Government installation.

3.10.2.9 Outdoor receptacles with weatherproof covers should be provided to meet OSHA lockout/tagout requirements and NEC Article 410-57(b).

3.10.3 Interior Electrical

3.10.3.1 Interior Electric Power Distribution

3.10.3.1.1 Buildings should be served from main switchboards in the electrical rooms at 480/277 volt, 3-phase, 4-wire for lighting, power and mechanical loads. DEPMED should be provided with 208/120 volt, 3-phase, 4-wire power supply.

3.10.3.1.2 Verify and coordinate the size of the main electrical room and closets with the architect.

3.10.3.1.3 Conductors for feeders should be sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of

power, heating, and lighting loads, or combinations of such loads – and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, should provide reasonable efficiency of operation.

3.10.3.1.4 The main switchboard and the distribution panels should have circuit breakers. Combination starters should be provided with fusible switches to serve motors in HVAC equipment. Branch circuit panels should be circuit breaker panelboard type with plug-in breakers. The main switchboard and distribution panels should be provided with a copper bus.

3.10.3.1.5 Interior conductors should be type THHN/THWN for conductor sizes #12 through 1/0, and XHHW for conductor sizes #2/0 and larger. All conductors should be copper. All conductors should be routed in conduit. Minimum conductor size should be #12 AWG, except conductors for fire alarm system should be #16 for initiation circuits. A separate green ground conductor, size per N.E.C. Article 250 “Grounding,” should be installed in all conduits containing receptacle and lighting circuits, and should be installed in all feeders from main switchboard to panelboards and motor/equipment.

3.10.3.1.6 The main electrical service switchboard ground bus should be connected to the metallic water pipe, structural steel, ground grid, or UFER ground. The service transformer neutrals and computer room grounding and equipment should be connected directly to the building service ground.

3.10.3.1.7 The following minimum loads should be assumed to determine the preliminary size of electrical service to the building:

Lighting Load	26.9 VA/sq m
Site Lighting	465 VA per fixture
HVAC Load	64.6 VA/sq m
Elevator	40 HP/elevator
Computer Load	10.8 VA/sq m
General Purpose Receptacles	5.4 VA/sq m
Miscellaneous Loads	10.8 VA/sq m
Future Spare Capacity	+25%
Minimum Power Factor	0.9
Transformer Impedance	5.75%

3.10.3.2 Interior Lighting



Figure 3-12
USARC, Camp
Parks, California

3.10.3.2.1 The lighting system should consist of 600 mm by 1200 mm lensed lay-in fluorescent light fixtures in offices, classrooms, corridors, toilets and general areas. All mechanical and small storage rooms should be provided with fluorescent strip lighting. All fluorescent light fixtures should be provided with energy saver lamps and ballasts.

3.10.3.2.2 Emergency lighting should be provided per NFPA 101 utilizing either battery emergency lighting fixtures or battery fluorescent ballasts. Battery-operated exit lights should be used. All emergency and exit lights should be connected to the room lighting circuit, ahead of any local switching. An emergency lighting fixture should be installed in all mechanical rooms.

3.10.3.2.3 Lighting foot-candle levels for the individual areas should conform to levels as indicated in Chapter 4.

3.10.3.2.4 In calculating foot-candle levels in the office areas, the following criteria for surface reflectance should be used. A maintenance factor of .7 should be used in the calculations.

Floors:	20%
Ceilings:	80%
Walls:	50%

3.10.3.2.5 Provide lighting fixtures with appropriate lamps for the function of the space.

3.10.3.2.6 Provide light switches in lobby areas, utility/equipment spaces, and special function rooms. Provide dual-level switching in conference rooms and classrooms.

3.10.3.2.7 Provide a wall or ceiling mounted combination light switch and passive infrared motion sensor for light control in private offices. Ceiling-mounted motion sensors shall be considered for large rooms.

3.10.3.2.8 Provide ceiling-mounted ultrasonic motion sensors for light control in open office areas, corridors, toilets, locker rooms, storage rooms and physical fitness rooms. Lighting in unit storage cages should be switched at the end of each row of cages, rather than within each cage.

3.10.3.2.9 Consider dimming ballasts in fixtures at spaces or portions of spaces where significant daylighting can reduce artificial lighting requirements; consider spaces such as lobbies, unit commons, unit storage, corridors, and assembly hall when daylighting is provided.

3.10.3.3 Power

3.10.3.3.1 All motors 1/2 HP and larger should be specified 3-phase 480 volts. Provide overload protection in the motor starters and short circuit protection for the motor and its feeder. Include single phase protection, also.

3.10.3.3.2 Where 120V motors are required by code to have thermal protection, manual thermal overload starters should be provided.

3.10.3.3.3 Disconnect switches should be provided for all motors and equipment.

3.10.3.3.4 In branch circuit, feeder and service calculations, compute receptacle loads at not more than 180 volt-amperes per outlet with demand factors according to NEC Article 220.

3.10.3.3.5 All general purpose receptacles should be 20 amps, NEMA WD 1. Ground fault circuit interrupter receptacles should be provided for bathrooms, maintenance bays and outdoor receptacles. Recessed floor outlets in the first floor and poke-through outlets on second and third floor should be provided to connect freestanding workstations in the open office areas. Provide multiple convenience receptacles adjacent to desk locations in individual and shared offices.

3.10.3.3.6 Light switches should be 20 amp, 120/277 volt AC, specification grade.

3.10.3.4 Special Requirements

3.10.3.4.1 Verify geotechnical report for soil resistivity and provide cathodic protection or wrapping of ferrous metals as required.

3.10.3.4.2 Provide building lightning protection if the calculations indicate that the facility lightning risk index (R) is above 3.0 (moderate) based on NFPA 780, Lightning

Protection Code. Coordinate lightning protection and grounding with information systems requirements.

3.10.3.4.3 Power connections to any SCIF room should be provided from a disconnect switch connected ahead of the main switch.

3.10.3.4.4 Consider providing power for video projector and including public address system with a microphone in any large conference room.

3.10.3.4.5 Provide multioutlet raceway, based on Tenant requirements, with receptacles in photo lab, NOC/IT, armorers' rooms, weapons repair and electrical/communications repair rooms.

3.10.3.4.6 Provide a minimum of 4 receptacles in reproduction rooms.

3.10.3.4.7 Provide receptacles for vending machines, faxes, printers, copy machines and special office equipment. Verify whether Tenants have any equipment with special electrical requirements.

3.10.3.4.8 Provide empty conduit system for intrusion detection system (IDS) in arms vaults and AGCCS. Provide power supply for the Government-provided IDS controller.

3.10.3.4.9 Receptacles located in hazardous areas of maintenance shop workbays should be mounted at a minimum of 460 mm above finished floor.

3.10.3.4.10 A security light outside the arms vaults should be provided.

3.10.4 Communications

3.10.4.1 A/E should determine the local telephone service provider in the area. A/E should record the company name, address, contact person, telephone number, e-mail address, and any discussions concerning service, requirements and costs. A/E should furnish a preliminary site plan with proposed telephone service conduit routing and estimated number of telephone instruments to the telephone company or local base.

3.10.4.2 Underground telephone service conduit, 103 mm diameter should be installed from the main telephone terminal board to the property line. Telephone service cable normally furnished and installed by the local telephone utility company.

3.10.4.3 Verify service needs for telephone switch with the Tenants; AR preference is for utility-provided switching, either remote or through a leased on-site switch. If Using Service approves an AR Installation-purchased switch, verify switch specifications and coordinate with communications design.

3.10.4.4 Design the interior telephone system in accordance with EIA/TIA-568, EIA/TIA-569, EIA/TIA-607 and ETL 1110-3-502 standards. The telephone system should consist of a raceway system (16 mm minimum conduit), unshielded twisted, 4-pair, category 5e, solid copper, #24 AWG telephone cable, outlet boxes, modular jacks, and telephone backboards. Design should include standard dual communication outlets for voice and data for each workstation. A voice outlet should be provided for each pay/wall phone. All individual workstation or desk jacks should be connected with one 4-pair, category 5e telephone cable from telephone closet terminal backboard and one 4-pair, category 5e data cable from NOC/IT room racks. All wall and pay telephone outlets should be connected with 4-pair, category 5e telephone cable from terminal backboard. All telephone instruments and equipment are furnished and installed by the contractor to provide a complete telephone system ready for use by the Tenants.

3.10.4.5 Provide a public address system with a power amplifier, speakers and microphones in assembly hall, and any large conference room or auditorium. Facility-wide PA systems for general communication are not authorized, except as a part of the telephone system and without additional speakers. However, a single-zone emergency PA system may be required to comply with AT/FP criteria.

3.10.4.6 Provide a telephone or similar annunciation/bell system at the main entrance, and other entrances as practical. Training centers have no receptionist, and are frequently locked during business hours; visitors will need a way to contact someone within the building.

3.11 Specifications

3.11.1 Unified Facilities Guide Specifications (UFGS)

3.11.1.1 The Using Service typically requires that AR projects utilize UFGS. UFGS is a standardized specification system (somewhat like MasterSpec and other master systems) and is regularly updated by DoD. It is available at no cost.

3.11.1.2 UFGS is a performance-based specification system, rather than a products-based system; references to manufacturers are discouraged in most cases. It is intended to identify salient features and requirements, and to permit any manufacturer or vendor to provide materials or products which comply with those requirements in accordance with Government mandates for nonrestrictive solicitation.

3.11.1.3 Some COE Districts and their clients provide versions of UFGS specifically tailored for their needs; AR is one of these. In most cases the tailored versions do not include all specification sections. The following UFGS versions may be required for a complete AR project specification (links to all of these can be found at www.lrl.usace.army.mil/ed/specs/cegs/specs.htm).

3.11.1.3.1 UFGS is the base document from which all versions are adapted, and includes almost all specifications which will be required for a complete specification. It will be the source for sections not included in the AR-tailored version, and may be obtained at www.ccb.org/ufgs/ufgs.htm.

3.11.1.3.2 UFGS Army Reserve Support Guide Specifications (RST or MDS) are the UFGS Sections modified and edited to reflect minimum standards of quality for AR projects. They may also contain references to manufacturers and model numbers, as well as additional technical and quality assurance features. These are the preferred specification sections for use on AR projects and may be downloaded from www.lrl.usace.army.mil/ed/specs/rst/mds.htm.

3.11.1.3.3 Some COE Districts also have CEGS versions tailored to their preferences and experience, such the CEGS Louisville District Guide Specifications (LRL). These may be preferred for non-RST Sections by the Districts that maintain them. They may be requested from the appropriate district. For Louisville District, see www.lrl.usace.army.mil/ed/specs/cegs/si.htm.

3.11.1.3.4 Occasionally a project may require a specification section not provided by UFGS. In such cases the designer may use commercial or in-house specifications.

3.11.2 SpecsIntact

3.11.2.1 The Using Service generally requires that AR specifications be prepared using SpecsIntact software. SpecsIntact is free software and can be downloaded at www.ccb.org/ufgs/ufgs.htm.

3.11.2.2 SpecsIntact (Specifications-Kept-Intact) is an automated system for preparing standardized facility construction specifications used worldwide by NASA, the U.S. Naval Facilities Engineering Command (NAVFAC), and the U.S. Army Corps of Engineers (USACE). Using the SpecsIntact software reduces the time and expense required to produce facility technical specifications, and reduces costly construction changes due to omissions, discrepancies or improper quality control. The system uses Master Guide Specifications prepared by each of the three agencies. SpecsIntact facilitates an interchange of construction specifications among Government agencies, therefore eliminating the necessity for the user's familiarity with multiple agency specification systems.

3.11.2.3 Users prepare specifications by editing the Master text in the SpecsIntact Editor, which employs an application of the Standard Generalized Markup Language (SGML). SGML is an international standard that provides a mechanism for defining and tagging elements of information within the documents. It is this SGML tagging system that allows the software to produce quality assurance reports and other automated features to reduce the time required to complete project specifications. The quality assurance reports verify the accuracy of technical references, submittal requirements, test and other requirements. It allows the user to turn on or off the view capability for tags, notes, metric units, English units, and revisions, and generates a Table of Contents for projects and sections.

3.11.2.4 When setting up SpecsIntact for the first time, all specifications will go into subdirectories called MASTERS directories. If using base UFGS, RST and district spec sections, three of these directories will be required (i.e., CEGS, RST and LRL for Louisville District). The specification writers will "pull" the necessary specification sections out of these three MASTERS directories into a project JOBS directory where they will be edited for the project.

3.11.2.5 The project shop drawing submittal register should also be

prepared using SpecsIntact.

3.12 Cost Estimating

3.12.1 The AR typically requires a cost estimate prepared using the Military Computer Aided Cost Estimating System (M-CACES). There are several versions of this software; the designer should verify with the Using Service whether a particular version is required. The USAR Design Process and Submittal Requirements has an excellent description of the desired scope of the estimate. A brief summary follows.

3.12.2 The estimate will be prepared as a Type K estimate when the national labor rates database is used. The estimate will be prepared as a Type A estimate when a site specific labor rates database is used. The estimate will be organized in the Work Breakdown Structure (WBS) established during the estimate creation process.

3.12.3 The estimate will be current, complete and accurate, reflecting the information contained in the design documents of the associated submittal. The level of detail contained in the estimate will be consistent with the level of detail contained in the other elements of the submittal. Square meter (SM) pricing and lump sum (LS) allowances may be used to price elements without sufficient design to warrant more detailed pricing methods.

3.12.4 Project escalation from the date of the estimate to the midpoint of construction shall be expressed as an Owner Cost applied to the project at the highest appropriate title level. Projects having more than one phase may require separate escalation values. The effective date of project supporting databases (Unit Prices, Labor and Equipment) may not reflect current pricing information for the project area. The Adjust Pricing feature of MCACES may be used to bring the project supporting databases to the current date and project area. Cost Escalation Tables and Area Cost Factor Tables will be provided by the Government to determine the applicable adjustment factors.

3.12.5 Design contingency may be applied at early design stages, depending on the amount of design anticipated outside MDS criteria. See specific design submittal requirements for applicable percentages. When used, assign this contingency as either an Owner Cost before Escalation or a Prime Contractor Indirect Cost after Bond, as the estimating software allows. DD Form 1391 typically provides a construction cost contingency: 5% for new construction and 10% for add/alter projects. No other contingencies are allowed.

3.12.6 For requirements on separation of MCAR and OMAR funding in

cost estimates, see Section 1.10 of this Guide.

3.13 Energy Conservation

3.13.1 Energy conservation through building design has received a great deal of attention in recent times. Tremendous potential exists for trimming energy consumption and operating costs in both new and existing buildings. Executive Order 13123 – “Greening the Government through Energy Efficient Management” was issued by President Clinton June 3, 1999. As such, it is the most current executive directive for energy management. Vice President Cheney has issued a National Energy Policy to President Bush, but this document has not become law. Additional energy conservation measures are incorporated in ETL 1110-3-491, “Sustainable Design for Military Facilities”, applicable to AR projects. (See Section 2.2.3.)

3.13.2 In compliance with Executive Order 13123, Section 202, facilities must reduce energy consumption by 30 percent of their 1985 energy consumption by 2005, and 35 percent by 2010. Reductions are to be calculated on an energy unit per gross unit area basis.

3.13.3 To establish an energy conservation target for existing buildings, an energy budget of the building for 1985 must be determined. Through the use of existing energy consumption data and computer-based energy use analysis programs such as BLAST, E-CUBED, TRACE, ESP-II, etc., an approximate energy consumption baseline can be determined and the target reduction calculated. If complete analysis is required, use the most cost effective of the above programs.

3.13.4 For new construction, the target energy budget figures, expressed in BTU's per square foot per year may be obtained from ETL 1110-3-309.

3.13.5 Select energy conservation alternatives to meet the target energy budget for either new or existing facilities. Analyze alternatives by computer-based energy usage simulation techniques. Model the facility as an entire system so that the interaction of multiple alternatives can be analyzed and the net energy savings determined.

3.13.6 From the analysis above, utilize the most efficient and cost effective systems to meet the energy budget. Determine cost effectiveness based on the life cycle cost. Life cycle may be calculated using software (blcc5.0) available from the Department of Energy.

3.13.7 Other energy conservation measures for consideration include the following:

3.13.7.1 Site Related

Buildings located to utilize winter sun, prevailing winds, and natural land forms.

Landscaping and planting to shade the building from summer sun and to block winter winds.

East/west orientation of long axis of buildings.



Figure 3-13
USARC, Arden Hills,
Minnesota

3.13.7.2 Building Envelope

New or replacement insulation: thicknesses, insulating values, insulation placement, and vapor barriers.

Energy efficient windows: reduced glass area, the number of panes, light transmission and reflectivity, type of window construction, window placement, double/triple glazed windows, etc.

Protection of windows from direct summer sun: overhangs, shades, blinds, solar films, tinted glass, solar screens and plantings.

Weather stripping and caulking to reduce infiltration.

Entrance vestibules.

Building shapes or frames with low exterior surface to volume ratio.

Maximize advantage of winter solar heat gain and natural daylight.

Earth contact design, such as full or partial wall berms or underground structures.

3.13.7.3 Distribution System

Pipe and duct insulation.

New or replacement steam traps.

Adjustable flow rates on fans and pumps to carefully match load.

3.13.7.4 HVAC Equipment

System zones based on the Tenant profile of the building.

High-efficiency boilers, furnaces and unit heaters.

Multiple boilers for better part load efficiencies.

Waste heat recovery devices.

High-efficiency air conditioning equipment.

Time clocks and setback thermostats.

Low leakage dampers.

Economizers.

High-efficiency filters to reduce ventilation and power usage.

Tempered air to exhaust hoods.

Computer-based energy management systems.

3.13.7.5 Domestic Hot Water

Insulated water heaters and storage tanks.
 Water conserving fixtures.
 Time clocks on water heaters.
 Waste heat recovery for water heating.
 Separate water heaters for kitchen and toilets.

3.13.7.6 Lighting

Decreased light levels in noncritical areas.
 High-efficiency lamps and ballasts.
 More efficient fixtures, and better lenses.
 Task lighting.
 Switching to allow for more individual control in unoccupied areas or naturally lit areas.
 High-efficiency exterior lighting with time clock or photocell control.
 Daylighting where possible in conjunction with light fixtures with dimming ballasts.

3.14 Antiterrorism/ Force Protection

3.14.1 AR-specific AT/FP criteria, applicable to the Interim AT/FP criteria document, defines the assembly hall or an auditorium as a “primary gathering structure or area,” where more than 50 people gather in one space. Training centers, DS/GS maintenance shops, and aviation support facilities are defined as “inhabited structures,” with a density of more than one person per 37 sq m (400 sf). OMS, AMSA, unheated storage and warehouse buildings all have a density of less than one person per 37 sq m (400 sf), and are defined as “uninhabited structures.” No AR-specific AT/FP criteria has been issued which correlates to UFC 4-010-01, as of the date of publication of this Guide. Designers should verify if such AR-specific guidance is available.

3.14.2 Spaces within structures are also defined as inhabited and uninhabited. The following spaces are uninhabited; all others are considered inhabited unless they are defined as primary gathering spaces.

3.14.2.1 Training Center Uninhabited Spaces

- Chair and table storage
- Library storage
- Training aid storage
- COMSEC storage
- Publication storage
- Unit and individual storage
- Staging area
- Janitorial storage
- Facility maintenance storage
- Vending alcove
- Mechanical/electrical/telephone

3.14.2.2 OMS/AMSA/DS/GS/Warehouse Uninhabited Spaces

- AMSA workbay
- Mechanical
- Tools and parts storage
- Storage room
- Battery room
- Supply room
- Unheated storage
- Warehouse area

3.14.3 The AT/FP criteria require a minimum standoff distance from property lines to inhabited structures, and to primary gathering structures. Uncontrolled parking and roadways also require minimum setbacks from primary gathering areas, and from inhabited structures or areas.

3.14.4 If the minimum standoff distances for the entire building or facility cannot be provided due to site constraints, the uninhabited spaces listed above may be located within the standoff distance. The inhabited and primary gathering spaces must be kept outside the standoff; if this is not possible, the building must be designed to withstand a blast in accordance with the criteria.

3.14.5 Trash containers must be kept a minimum distance from inhabited structures, and from primary gathering areas. This includes trash containers serving the kitchen area; they must be a minimum distance from the assembly hall.

3.15

Accessibility

3.15.1 All building entrances and POV areas should be accessible to accommodate visitors and civilian employees.

3.15.2 Provide accessible parking spaces in accordance with ADA-AG and UFAS.

3.16

Environmental

3.16.1 Noncontaminated Site Issues

3.16.1.1 Wetlands



Figure 3-14
USARC, Arden Hills,
Minnesota

3.16.1.1.1 The site topographic survey should include delineation and survey the limits of wetlands identified on the site, if any. The first consideration is to avoid wetland areas and to direct on-site drainage to storm water treatment or storage ponds prior to discharge into wetlands. In addition to meeting Federal regulations regarding wetlands, it is recommended that designer coordinate with State and local agencies with water resource/wetland jurisdiction. The RSC and COE District Office should be consulted for points of contact with such agencies.

3.16.1.1.2 If the area of wetlands impacted is over the regulatory maximum, wetland mitigation will be accomplished according to the standards of the local or state water resources agency. The site size may not have sufficient area to accommodate wetland mitigation. Off-site mitigation or purchase of wetland mitigation credits from established wetland mitigation banks may be required, but should be avoided if possible due to associated costs and complications of off-site work.

3.16.1.2 Noise and Air

3.16.1.2.1 Any noise and air impacts identified from the Environmental Assessment which require mitigation or permitting will be incorporated into the design. Typical emissions from a site might include boilers and other equipment that emit heat, fumes or particles.

3.16.1.2.2 Typically, site locations are in areas which permit commercial or industrial type uses with corresponding noise and air quality standards. The general layout of the site should consider locating areas of concentrated vehicle operations and

associated noise away from neighboring properties for which noise may be an issue.

3.16.1.3 Traffic Safety

3.16.1.3.1 As outlined in Section 3.2, coordination with local roadway agencies and implementation of DOT recommended roadway geometrics will accommodate a majority of the site traffic safety needs. The roadway agency may dictate control devices such as stop signs other roadway design features at access points.

3.16.1.3.2 If the size of the site and its interior site traffic circulation is substantial, consider designing traffic control signs such as stop signs, pedestrian crossing warning signs, pavement markings, directional signs, information signs, and speed limits to provide safe traffic control and eliminate confusing traffic patterns on the site.

3.16.1.4 Groundwater

3.16.1.4.1 Groundwater is not a substantial issue on most sites; however, some sites may have shallow groundwater tables which may affect the methodology of construction, and require measures such as temporary dewatering to install items such as deep utilities and foundations. The contractor will be required to obtain the necessary state and local permits for dewatering operations and to control its appropriation and discharge. Items such as French drains or infiltration wells should not be used.

3.16.1.4.2 Other site uses such as wash racks and refueling points, which may introduce contaminants to the groundwater, must be controlled to contain potential releases contaminants, and the design must address the control measures.

3.16.1.4.3 If the site is near a municipal well, wellhead protection provisions may be in effect. The utility or well owner will be contacted regarding these provisions. Wellhead protection provisions may also be required by state rules in some locations.

3.16.1.5 Water Quality

3.16.1.5.1 Surface water runoff quality is addressed in Section 3.2 above. Facilities which could affect the quality of runoff water, such as wash racks and fueling stations, will be connected to a local sanitary sewer through on-site oil/water separators and/or mechanical water/contaminant separators.

3.16.1.5.2 Exterior connected drains to sanitary sewers shall be under roofed areas or contain valves to control discharge into the sewer. Containment areas may also be provided for contaminants which may affect surface or groundwater quality to provide for its control prior to being safely collected and removed and disposed of by hazardous material teams or contractors.

3.16.1.6. Temporary Construction Impacts

3.16.1.6.1 Temporary erosion and sediment control requirements are addressed in Section 3.2.1.3 above. Other requirements may include use of flagpersons and/or special control signs during site construction, for access to the site and on-site routing of construction traffic.

3.16.1.6.2 Fugitive dust from construction shall be controlled by use of application of water or dust retardant chemicals to earthwork areas. Air omissions and noise due to construction are recognized as temporary environmental impacts and generally do not require mitigation or special permits other than the normal licenses or permits required by construction contractors.

3.16.1.7 It is not unusual for AR sites to harbor protected wildlife. The design will address any measures identified in the project environmental documentation.

3.16.1.8 Areas with natural vegetation should be preserved to the extent possible.

3.16.2 Contaminated Site Issues

3.16.2.1 Asbestos/Lead/PCBs

3.16.2.1.1 New construction will not incorporate materials which contain asbestos, lead or PCBs, or will only incorporate them in environmentally acceptable forms. Designs for existing facility alterations will normally include mitigation provisions. Mitigation design is typically based on previously accomplished environmental assessments, and feasibility and mitigation studies, but occasionally may require the designer to perform environmental investigations.

3.16.2.1.2 Mitigation design will comply Federal, state and local rules and regulations, and will normally be completed with regulatory closure approval prior to other construction. The construction contractor should be made liable for control and use of potentially contaminating materials used in their operations.

3.16.2.2 Petroleum Products

3.16.2.2.1 Any environmental studies conducted prior to development should identify whether there are on-site petroleum contamination issues. If petroleum contamination consists of surface spills or shallow concentrated areas, the areas are normally mitigated by removal and disposal of the fuel and any adjacent contaminated soil. Underground tanks should be removed and contaminated soils disposed of, with regulatory closure prior to construction on the site.

3.16.2.2.2 Certain Government sites, usually on existing Government installations, may be included in a larger zone of petroleum contamination. In such cases, the Government may make a determination that the site is developable even with the presence of petroleum contamination. Site design should address possible vapor emissions and accommodate any existing monitoring wells, extraction wells or treatment facilities. Contractors will be required to have approved health and safety operating plans in place prior to commencing work on the site.

3.16.2.3 Munitions

3.16.2.3.1 Some Government sites will have had munitions storage, training, manufacturing, or handling facilities. In such

cases, the site should be cleared of all munitions by Government ordinance disposal teams or contractors.

3.16.2.3.2 Soil and groundwater sampling programs should identify any contamination issues from munitions, chemicals or related materials. The site should be cleared of munitions and related contamination, and have regulatory closure prior to construction on the site.

3.16.2.4 Identification of ongoing site contamination due to off-site actions beyond control of the Government will be identified and measures to address the contamination developed.

Chapter 4

Individual Space Criteria

4.1

General

4.1.1 The individual space design criteria and information in this Chapter reflects typical guidance on usage and code compliance; the Design Agency should verify that it meets the Tenants' needs and complies with the specific code and other requirements of their project.

4.1.2 This Chapter delineates the functional and environmental requirements for most individual spaces within the training center and maintenance buildings. Not all projects include all of the spaces, nor are all of the possible types of spaces included in this Design Guide. Specific information regarding the types and sizes of spaces authorized are determined by the project documents. The Using Service will supplement the information herein at the initial design conference.

4.1.3 The space sizes noted below reflect current AR authorizations for the spaces. The Using Service will provide the actual authorized area for each space in the project documents, and where there are differences between the areas in this Guide and the project documents, the project documents govern. Since the Government building authorization includes an allowance for structure, these are assumed to be net space authorizations. The Design Agency should endeavor to match the design to the authorized spaces, but it is acceptable for actual area of any space to vary from the authorization by plus or minus 10%, except for the assembly hall, which cannot be larger than authorized.

4.1.4 The spaces listed in this Chapter are those common to most AR units and facilities. There are additional spaces which are authorized only for certain types of Reserve Units. Information on the spaces, and their authorized area, can be found in AR 140-483.

4.1.5 Occasionally, the Tenants will identify what they believe is a requirement for a space or function that is not in the project authorization documents. When such a requirement is approved by the Using Service, the space to accommodate must come "out of hide;" the Design Agency must borrow the necessary space from other spaces. One example of such a space is a photo identification room for making facility or installation identification cards for the Tenants and their dependents.

4.1.6 Fire sprinkler for all spaces is light hazard, unless noted otherwise by specific room below.

4.1.7 All locksets should be mortise-type; functions are shown by specific space below.

4.1.8 All equipment indicated for spaces below is part of the design and construction, unless noted as provided by Government or Tenants.

4.2 Training Center Building

4.2.1 Full-time Offices

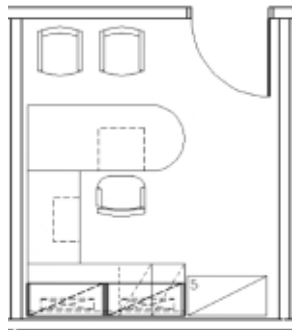


Figure 4-1
Single Office

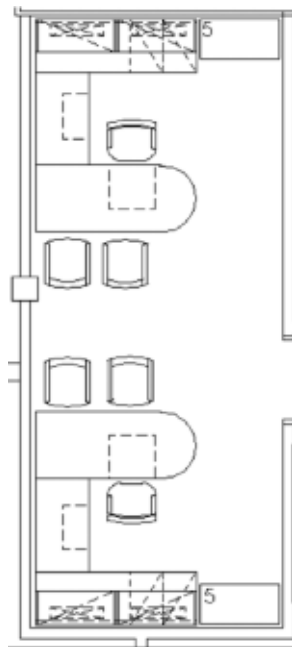


Figure 4-2
Double Office

4.2.1.1 Full-time offices are used by permanent AR staff for the daily administration tasks associated with the unit's mission and the operation of the facilities. The full-time staff typically works 8-hour days from Monday to Friday, and they are the major building Tenants during the week. Design of these spaces will be similar to a typical business office.

4.2.1.2 Full-time offices may be designed for a single occupant or for multiple occupants, based on Tenant requirements and functional efficiency. In some cases, the Design Agency may wish to recommend combining some full-time offices for reasons of design efficiency or flexibility.

4.2.1.3 Consider providing multiple convenience receptacles at desk locations to accommodate potential for a variety of equipment that may be utilized. Avoid room arrangements that have the occupants' back to the door.

4.2.1.4 Higher-ranking (Colonel and above) officers will expect a higher level of finishes than described below for typical private office space. Carpet and paneling are typical, as are wood furnishings. A General officer will typically have a suite which includes his staff, and may expect all spaces within the suite to have the higher level of finishes.

4.2.1.5 Space Design Information

General/Code

Size – 11 sq m (120 sf) each typical; larger for higher ranks

Occupancy – business

Occupancy count – 1 person per single office; shared offices 2-10

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8")

Floor – carpet; VCT as an alternative

Base – rubber



Figure 4-3
Office for 4

Walls – painted gyp board; vinyl or paneling as an alternative
Ceiling – suspended acoustical ceiling tile (ACT)
Trim – coat hooks; chair rail to protect walls

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience and computer duplexes

Voice/data – two telephone/data duplexes per workstation

Furniture

Workstation with box/box/file and file/file pedestals

Keyboard tray with mouse pad

Overheads with task light

Tackboard

Mid-or high-back desk chair

Two guest chairs

Lateral files and/or bookcases

Optional coat tree

Equipment

Verify if additional equipment required in some offices

Special features or considerations

4.2.2 Unit Exclusive Offices

4.2.2.1 Unit exclusive offices are used periodically by AR supervisors for training, training administration, and the operation of the units. The majority of the use will occur on drill weekends.

4.2.2.2 Space Design Information: Design of these spaces will be same as the full-time offices above, and the same space design information applies.

4.2.3 Unit Commons

4.2.3.1 Unit commons provide working areas and workstations for the AR soldiers, for training and administrative tasks. Use typically occurs on the soldiers' drill weekends, with different units and soldiers using the spaces on different weekends. Unit commons space authorizations do not typically include circulation space; 6.67 sq m (60 sf) is authorized for each unit common workspace, and an

individual workstation will require most of that authorization. Circulation from the allocation for the building must be used to provide sufficient space for a functional unit common space. Some of those who prepare project authorizations allow for this and shift space from circulation to unit commons when preparing the space allocation worksheet.



Figure 4-4
Unit Common

4.2.3.2 Individual open office workstations are the typical furnishings for unit commons areas. Additional counters or furniture may be required to accommodate Tenants' equipment, such as printers, coffeemakers, and similar items (these are not to be powered from systems furniture). The Tenants should be asked to provide information on their other equipment and space needs.

4.2.3.3 In addition to the files provided in the workstations, the Design Agency should try to provide sufficient space for common-use file cabinets in most unit commons.

4.2.3.4 Space Design Information

General/Code

Size – 5.6 sq m (60 sf) each authorized unit common space, plus 15% of total for circulation

Occupancy – business

Occupancy count – varies; 1 person per workstation or seat

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board; paneling as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail to protect walls

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience duplexes

Voice/data – telephone and data outlets



Figure 4-5
Unit Common

Furniture

Approximate 2.1 m by 2.3 m (7 ft by 7.5 ft) workstations

Box/box/file and file/file pedestals

Keyboard tray with mouse pad

Overheads with task light

Mid-back armchair

Coat hook

Equipment

Verify if common-use printers, faxes, coffeemakers, etc., will be provided by Tenants

Cabinets with counters can be provided

Special features or considerations

Consider sinks for coffee stations in larger commons

Dedicated 20A circuits for any large printers

Circulation space must come from facility circulation allowance

Guest chairs and additional storage can be added to workstations

Some Tenants prefer to have team groupings of workstations, or a few table/chair stations which can also function as meeting areas

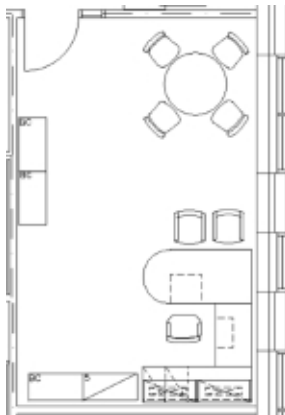
4.2.4 Recruiting/Retention Offices

Figure 4-6
**Recruiting/
Retention Office**

4.2.4.1 This space is for unit retention personnel and is used primarily for administrative purposes. This space is also where potential members and re-enlistees are interviewed. The retention office must be easy to locate, adjacent to the main entrance, and adjacent to full-time recruiting personnel. This space is shared by all assigned units.

4.2.4.2 There will also be an office to accommodate two full-time recruiting personnel, as part of the full-time office space authorization. It should be located adjacent to the recruiting/retention office. Glazed panels (door or sidelight) may be used to emphasize public accessibility.

4.2.4.3 Space Design Information**General/Code**

Size – 23.25 sq m (250 sf) each typical

Occupancy – business

Occupancy count – 1 to 4

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8")

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat hooks; chair rail to protect walls

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience and computer duplexes

Voice/data – telephone and data outlets

Furniture

Workstations similar to full-time offices above

Lounge chairs or table and chairs in a seating area

Lateral files, bookcases, and/or literature racks

Optional coat tree

Equipment

Verify if printers, fax machines, coffee machines, etc., will be
provided by Tenants

Dedicated 20A circuit for any large printer

Special features or considerations

Space for Tenants' literature racks may be required

4.2.5 Family Support Office

4.2.5.1 This space is for the use of the Tenants' family support groups, and for unit members' families when they are meeting with the family support groups. It should be located near the main entry to be easily accessible to the visiting family members. The space authorization is typically 18.6 sq m (200 sf).

4.2.5.2 Consider providing a window or door sidelight into an adjacent lobby or corridor but provide blinds to allow for privacy when needed.

4.2.5.3 Furniture should be coordinated with the Tenants, most prefer some workspaces with visitor chairs, and a seating group around a coffee table. Consider a small refrigerator for drinks for visiting family members.

4.2.5.4 Space Design Information: Design of these spaces should be similar to the recruiting/retention offices above and the same space design information applies.

4.2.6 Administrative Support

4.2.6.1 Message Center/Mailroom

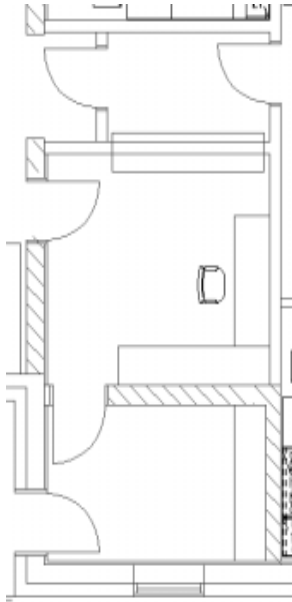


Figure 4-7
Mailroom

4.2.6.1.1 The message center is the point for receipt and distribution of all interoffice and intraoffice correspondence. This space will not be staffed full-time, but will provide a sorting and mail pickup area.

4.2.6.1.2 The message center should be enclosed and equipped with a lockable door and should be designed to maximize wall space. A vestibule for picking up mail is required, rather than having mail slots open into the lobby or corridor. A Postal Service approved mailbox unit is provided; coordinate size and number of mail slots with Tenants. Most Tenants prefer mail slots that will accommodate 8 1/2 by 11 envelopes without folding.

4.2.6.1.3 The message center space authorization should be divided into three spaces; the vestibule, the mail handling/sorting area, and a separate room where mail can be delivered and inspected prior to sorting for AT/FP purposes. The delivery/sorting room should have CMU walls, floor to structure. It is strongly preferred that Postal Service or other delivery personnel deliver directly to the delivery/sorting space.

4.2.6.1.4 Mail sorting/handling rooms will have gyp board walls from floor to structure, and a gyp board ceiling to provide evidence of attempted entry.

4.2.6.1.5 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT; carpet as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc; dual-level switching

Receptacles – convenience duplex, some at counter height

Voice/data – telephone and data outlets

Furniture

Adjustable stool with back

Equipment

Verify if postage or other machines require power

Upper and lower cabinets with counters for work space and storage

Special features or considerations

Mail slots may require fire doors if they open into a corridor

Some units locate a large copier in this space

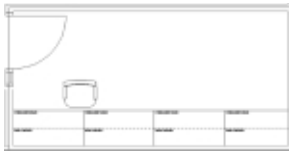
4.2.6.2 Reproduction

Figure 4-8
Copy Room

4.2.6.2.1 This space provides for the reproduction and collating of administrative correspondence, bulletins, orders, and similar paperwork. The space may also house hard copy printers connected to computers in the office space or to the LAN. Diazo or blueprint reproduction is not typically included in this space.

4.2.6.2.2 The reproduction space should be located adjacent to the administration space. The space must be large enough to accommodate the Tenants' copiers, and have table or counter space for collating and binding. Sufficient storage space should be provided for operating quantities of paper, toner, ink, office supplies, forms, etc. The size of this area will be relative to the size of the unit and specific reproduction requirements.

4.2.6.2.3 Space Design Information**General/Code**

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT; carpet as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience duplexes

Voice/data – wall-mounted telephone

Furniture**Equipment**

Verify equipment by Tenants and power/data requirements

Cabinets with counters for work space and storage

Special features or considerations

Large copiers may require exhaust

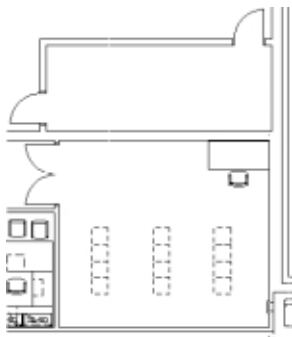
4.2.6.3 Information Technology (IT)

Figure 4-9
NOC

4.2.6.3.1 The information technology rooms are separate from the telephone room, which is the service entrance for the telephone service. All facilities will have a network operations center (NOC) room and an NOC electrical closet. As facilities increase in size, a work area is added. A facility designated as a Direct Reporting Command (DRC) or RSC headquarters receives office and work space for the NOC staff in lieu of the work area, plus a secure NOC and an IT closet.

4.2.6.3.2 The sizes of the IT spaces also vary based on the facility size and designation; the specific space authorizations will be provided in the project documents.

4.2.6.3.3 In larger or multistory facilities, additional IT hub rooms may be required to maintain compliance with the

restriction of 91 meters (300 ft) maximum for IT cable runs beyond a hub. The minimum size for an IT hub room is 3050 mm by 4250 mm (10 ft by 14 ft).

4.2.6.3.4 Refer to the “USAR CIO Information Technology Requirements for Military Construction Army Reserve” for the specific size, equipment and furniture requirements of the IT spaces.

4.2.6.3.5 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – static-dissipative VCT

Base – rubber

Walls – painted gyp board

Ceiling – exposed structure, painted

Trim – coat hooks for work space; chair rail to protect walls

Lockset – storeroom or classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience duplexes

Voice/data – two voice/data duplex receptacles per workstation

Furniture

Refer to criteria memo - model furniture on similar spaces

Equipment

Refer to criteria memo

Special features or considerations

Separate HVAC for equipment; size air conditioning equipment for specific IT room requirements

Consider providing a high-temperature warning light in a well-traveled corridor.

Refer to USAR-CIO criteria memo

4.2.7 Lobby

4.2.7.1 The lobby provides an entryway and reception area for unit personnel and visitors. It is one of the first images observed by visitors, and should reflect feelings of pride and commitment characteristic of the Army Reserve.

4.2.7.2 As the primary public entrance to the training center building, the entry must be readily identifiable from the parking lot and pedestrian access routes. The entrance should have an adequate exterior overhang or vestibule, and the design should provide an ordered, warm, friendly invitation to the public.

4.2.7.3 The lobby must be adjacent to a permanently staffed office since there is no receptionist, and must accommodate circulation, traffic patterns and waiting space. Graphic displays, such as Minuteman and units' plaques, trophies and awards, should be placed in a visually prominent location.

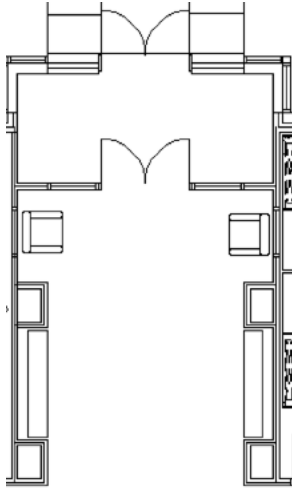


Figure 4-10
Lobby

4.2.7.4 Space Design Information

General/Code

Size – 44.6 sq m (480 sf); may augment from circulation space

Occupancy – business; may be assembly if associated with assembly hall

Occupancy count – 1 person per 9.3 sq m (100 sf); more if considered assembly waiting space

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2750 mm (9 ft) minimum

Floor – quarry tile; carpet or VCT as an alternative

Base – quarry tile; rubber as an alternative

Walls – painted gyp board

Ceiling – gyp board; suspended ACT as an alternative

Trim – guardrail and corner guards to protect walls

Lockset – panic hardware; locksets are Tenant preference

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – none; maintained – none

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 20 fc

Receptacles – convenience duplexes

Voice/data – pay phones

Furniture

Lounge chairs and tables

Trophy cases, bulletin boards and literature racks

Equipment

Trophy and display cases (built-in preferred)

Special features or considerations

Verify if Tenants require card readers, door security, CCTV, etc.

Special lighting for displays

Building directory

Finishes in this space may be upgraded for image reasons.

AR does not want wall vinyl due to difficulty of repair.

Concealed sprinkler heads for esthetics.

4.2.8 Assembly Hall

4.2.8.1 The assembly hall provides space for troop formations, maintenance of equipment, personnel assemblies, food service seating and large group assemblies for instructional training. It is a multipurpose space which will be used for any large indoor events associated with the facility.

4.2.8.2 Tenants occasionally request that the assembly hall be divided with operable panel partitions to enable its use as additional classrooms or a conference center; this requires Using Service approval. In this configuration, an adjacency to the other classrooms should be considered.

4.2.8.3 Tenants also occasionally request an overhead door to allow vehicle entry for loading for maneuvers; this was typical in older armories, but is discouraged now. If approved by the Using Service, the assembly hall finishes should be downgraded to reflect this more utilitarian function and use.

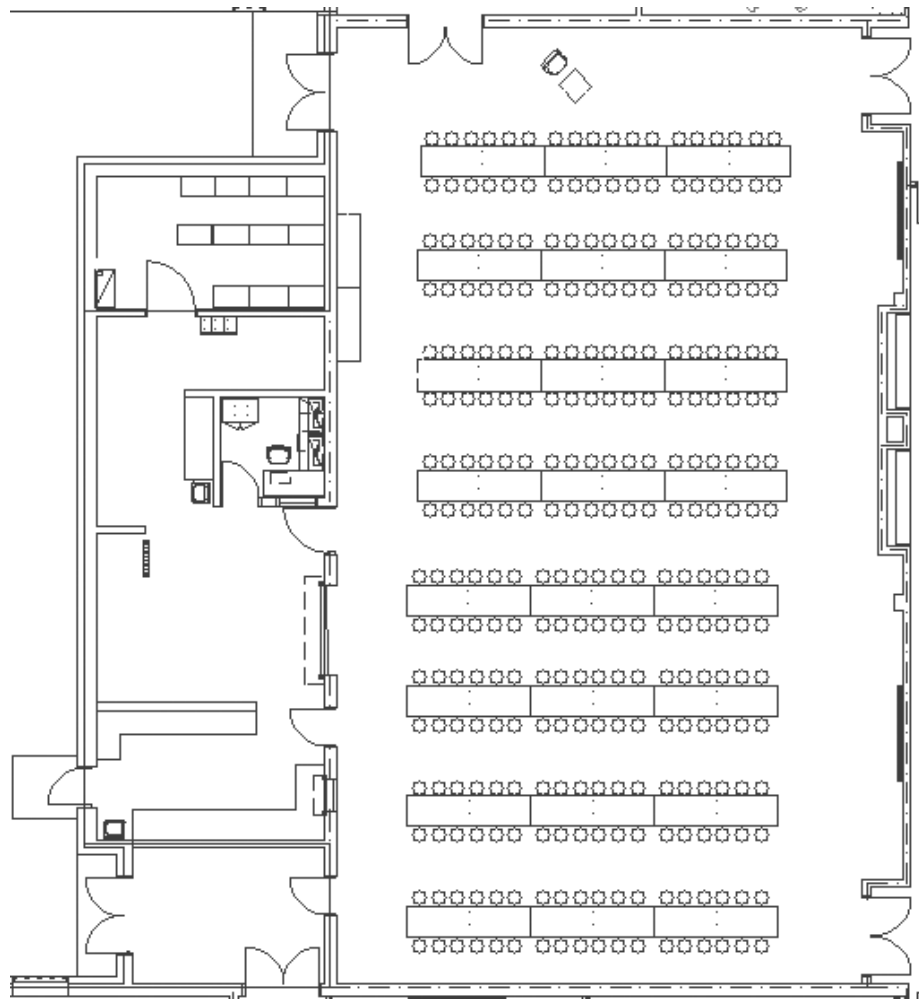


Figure 4-11 Assembly Hall and Kitchen

4.2.8.4 Space Design Information

General/Code

Size – varies

Occupancy – assembly

Occupancy count – varies; typically less intensive use assembly space

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 4300 mm (14 ft)

Floor – VCT; concrete with sealer or paint if truck access

Base – rubber

Walls – painted gyp board; painted CMU if truck access

Ceiling – suspended acoustical ceiling tile (ACT); none if truck access

Trim – wall guardrail to protect walls

Lockset – panic hardware

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc; dual-level switching

Receptacles – convenience receptacles

Voice/data – two voice/data duplexes per wall

Furniture

Folding tables and chairs, or fold-up tables with attached stools

Floor lectern and adjustable stool

Equipment

Public address system with speakers and microphone outlets – contractor-supplied

Ordinary hazard sprinklers

White boards and projections screens may be added if Tenants desire

Special features or considerations

Typically must be separated from adjacent spaces with rated wall

If operable partition, provide structural support and stacking space

If fold-up tables with attached stools are provided, ensure that door to chair storage is tall enough to accommodate their loaded storage/moving cart

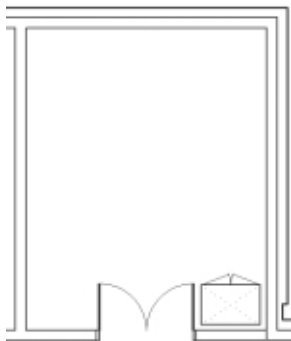
4.2.9 Chair and Table Storage

Figure 4-12
Chair and Table
Storage

4.2.9.1 This space is for the storage of the assembly hall tables and chairs when not in use. The PA system for the assembly hall is also typically located here.

4.2.9.2 This space should not be used for mechanical equipment or electrical panels due to the potential for damage to them or obstruction by the stored furniture.

4.2.9.3 Space Design Information**General/Code**

Size – 10% times assembly hall authorized area

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 3000 mm (10 ft)

Floor – sealed concrete

Base – rubber

Walls – painted gyp board; painted CMU as alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – wall guard to protect walls

Lockset – storeroom on active leaf; flush bolts inactive

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – none; maintained – none

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 10 fc

Receptacles – convenience duplex plus dedicated outlet for PA

Voice/data – none

Furniture

Storage/moving carts for assembly furniture should be included

Equipment

Storage cabinet with PA system for assembly hall

Special features or considerations

Conduit to roof-mounted AM/FM antenna may be desired

4.2.10 Kitchen (See Also Appendix E)

4.2.10.1 The kitchen module provides space for training of cooks, and for preparation of meals. It includes space for food preparation, cooking, serving and for the storage and cleaning of cookware and serving ware, and is divided into four areas. It is strongly recommended that designers of non-MDS projects request a copy of the MDS standard kitchen drawings for reference.

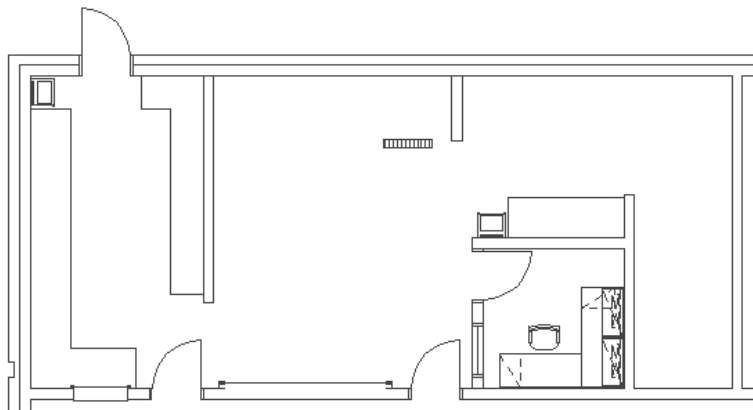


Figure 4-13 Kitchen

4.2.10.2 The kitchen area is the area where food is prepared, cooked, and served. The scullery is the area where soiled cooking and serving ware is cleaned, and stored when clean. The food storage area provides space for storage of perishable and nonperishable food, and kitchen supplies. The office provides administrative space for the kitchen supervisor.

4.2.10.3 Most codes require rated coiling doors at the openings for food serving and tray return between the kitchen and assembly hall, as part of a one-hour separation between the two spaces. These doors should be on smoke-detector-activated hold-opens.

4.2.10.4 Space Design Information

General/Code

Size – 75.3 sq m (811 sf)

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – abrasive quarry tile

Base – glazed CMU

Walls – glazed CMU; molded fiberglass as an alternative

Ceiling – epoxy-painted cement board

Trim – stainless steel corner guards and door kick plates

Locksets – office, classroom, storeroom and panic

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 27 degrees C (80 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc for office and kitchen; 30 fc for scullery and food storage

Receptacles – convenience duplex in addition to equipment requirements

Voice/data – voice/data outlet for office

Furniture

See full-time office above for kitchen office furniture

Equipment

See Appendix E

Special features or considerations

Exhaust hood over cooking equipment – verify fire protection requirements – direct-fired makeup air unit

Typically must be separated by rated construction
 Wet location light fixtures
 Contractor to shut down power to equipment under hood –
 coordinate with fire protection
 A grease trap must be provided
 May require an adjacent exterior concrete pad for MKT - 9.2
 sq m by 9.2 sq m (30 ft by 30 ft)

4.2.11 Arms Vault

4.2.11.1 The arms vault provides secure storage of all weapons assigned to units at the facility. Ammunition may be stored in small amounts in some instances. It will not be located on an exterior wall.

4.2.11.2 Construction of the vault is governed by AR 190-11, and will be cast-in-place, reinforced concrete. In general, walls must be 205 mm (8 in) thick minimum, reinforced with 13 mm (#4) reinforcing bars at 230 mm (9 in) on center each way, each face, with the two layers staggered, to provide a projected 115 mm (4-1/2 in) grid. Ceilings must be a minimum of 205 mm (8 in) thick, with a minimum reinforcement of 13 mm (#4) reinforcing bars forming a grid such that no opening exceeds 62,000 sq mm (96 sq in). Structural floors will be equivalent to ceiling requirements. Slabs on grade will be 153 mm (6 in) thick with #10 bars at 300 mm o.c. each way (#3 at 12" o.c.). Refer to AR 190-11, Chapter 4 and Appendix G, for additional vault construction requirements, including securing rings for securing the weapons in the racks. The structural documents must prominently display the following note: "Concrete placement for arms vault walls and roof may not proceed until written security certification and Contracting Officer approval is received. Certification can only proceed after reinforcing steel is in place. The contractor shall provide the Contracting Officer a two week notice, minimum, prior to concrete placement for the security inspection to take place. Beware that separate concrete placements for various portions of the vault must have separate inspections. It is the Contracting Officer's responsibility to obtain security certification from Army Reserve Security Specialists and/or the installation Provost Marshal."

4.2.11.3 A Class V vault door capable of swinging open 180 degrees, with a heavy duty doorstop, will be provided. Day gates, with a pass-through capability for issuing weapons, may be provided if Tenants desire.

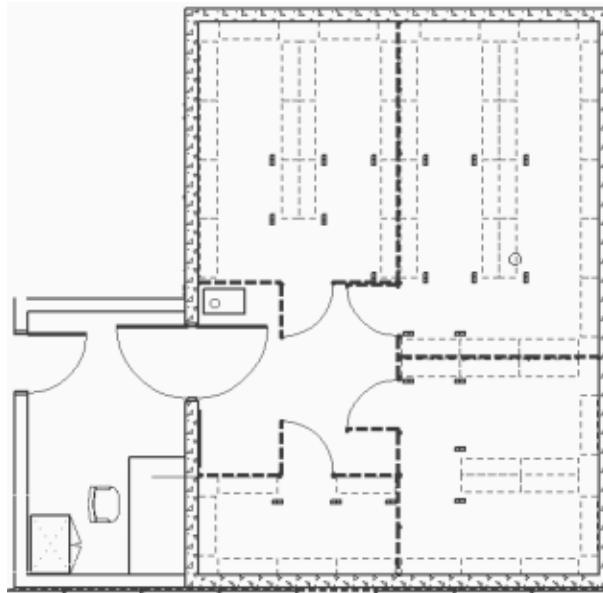


Figure 4-14 Armorer's Room and Arms Vault

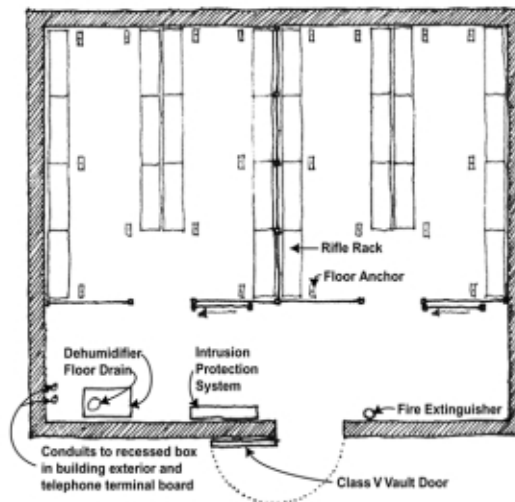


Figure 4-15 Arms Vault Systems

4.2.11.4 Provide floor anchors for weapons racks and rough-in for an intrusion detection system (IDS). Although the system and installation will not be included in the construction contracts, coordination with the AR Installation will be required. An alarm control box will be placed outside the caged areas, but inside the vault. Refer to AR 190-11 for security criteria. Electrical power is to be provided through a nonfused 30 amp disconnect switch, located in the arms vault, to a lockable 30 amp disconnect switch fused for 20 amps, connected ahead of the main in the electrical room. A 19 mm (3/4 in) rigid conduit will be provided from the telephone terminal board to a junction box located in the arms vault and a 19 mm (3/4 in) rigid conduit from the arms vault junction box to a recessed junction box mounted on the building exterior.

4.2.11.5 Provide a 110 volt outlet and a 50 mm (2 in) diameter floor drain for the dehumidifier. These should be located adjacent to each other and outside of the caged areas.

4.2.11.6 Battery backup, fluorescent fixtures to illuminate the vault door should be provided over the vault door if it opens into a corridor or other space other than the armorer's room, such as the assembly hall of unit storage. These lights will be connected directly to the panel board. If the vault door opens into the armorer's room, this egress lighting should instead be provided outside the armorer's room door.

4.2.11.7 Coordinate lighting and caging layout to allow caging walls to extend to ceiling. In laying out arms vaults, use a 1525 mm (5 ft) module for width to allow a 915 mm (3 ft) aisle between 260 mm (10-1/4 in) wide rifle racks. Use a 915 mm (3 ft) module for length to allow for 915 mm (36 in) rifle racks.

4.2.11.8 Gun racks and containers are Government-supplied and installed. Wire caging on the modules described above is to be provided in vaults serving more than one military unit if requested. Class V containers (safes) are approved for use instead of small arms storage racks and arms rooms where small quantities of weapons, central firing components and related ammunition are stored. Specific cabinets authorized for use are listed in AR 190-11.

4.2.11.9 A dehumidifier outside the caged area should be provided. A fire extinguisher should be located adjacent to the motion detection control box, both of which should be outside caged areas.

4.2.11.10 Anchorments for securing weapons in the racks should be provided in the floor, and must be coordinated with floor construction and reinforcing. Floor anchorments should not protrude from floor, and must be coordinated with slab thickness and reinforcing; consider using airport mooring eyes, as manufactured by Neenah Foundry and others.

4.2.11.11 For revitalization programs, modular arms vaults are acceptable if they meet the criteria of Federal Specification AA-V-2737, Modular Vault Systems, and are approved by GSA. One manufacturer of such vaults is Custom Vault Corporation, Alexandria, VA; their vaults must be installed in humidity-controlled environments. A new floor may be required, depending on condition of existing floor.

4.2.11.12 Space Design Information**General/Code**

Size – varies

Occupancy – business

Occupancy count – not occupied; typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 2500 mm (8' - 2") minimum

Floor – sealed concrete

Base – none

Walls – painted concrete

Ceiling – exposed structure, painted

Trim –

Lockset – by vault door supplier

Mechanical

Heating – none

Cooling – none

Ventilation – 2.5 L/S/SQM thru transfer ducts; duct openings must comply with AR 190-11

Electrical

Lighting – 50 fc;

Receptacles – convenience duplex; dedicated 20A for dehumidifier

Voice/data – dedicated telephone connection to IDS supervision

Furniture**Equipment**

Dehumidifier (pipe to floor drain) by contractor

Special features or considerations

24-hour fluorescent, vandal-proof fixture outside vault door, above door

Power, conduit and boxes for intrusion detection system (IDS) by Government

Minimize penetrations in vault envelope

Tenants may want a Dutch door for weapons distribution

4.2.12 Armorer's Room

4.2.12.1 The armorer's room provides a space for weapons issue, inspection, training, cleaning and repair.

4.2.12.2 If the arms vault door opens into the armorer's room, a physical security light is required outside the armorer's room door - see 4.2.11.6.

4.2.12.3 Space Design Information

General/Code

Size – 9.3 sq m (100 sf)

Occupancy – business

Occupancy count – 1 person

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience and computer duplexes

Voice/data – two voice/data duplex receptacles

Furniture

Adjustable stool with back

Equipment

Workbenches and storage cabinets

Special features or considerations

Continuous 110 v power strip above the workbenches

4.2.13 Classrooms

4.2.13.1 This space is used primarily for instructional training of unit personnel, but may also be used as a conference/meeting room on occasion.

4.2.13.2 Classroom space authorizations are based on 0.75 sq m (8 sf) per person. If the authorization allows, some larger and some smaller classrooms should be provided, with larger classrooms accommodating up to 50.

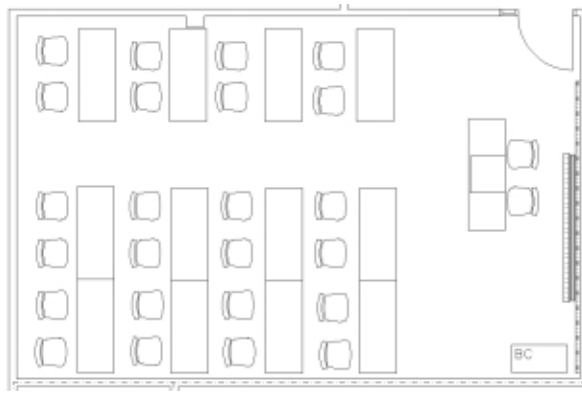


Figure 4-16 Classroom

4.2.13.3 The larger classrooms can be subdivided with a quality operable panel partition, with an STC rating of 48-52. Extend the sound attenuation above the ceiling to eliminate flanking points. For subdivided rooms, provide equipment for both sides of the partition. Specifications for operable partition should include O & M manual, and provision of multiple sets of any required operating hardware.

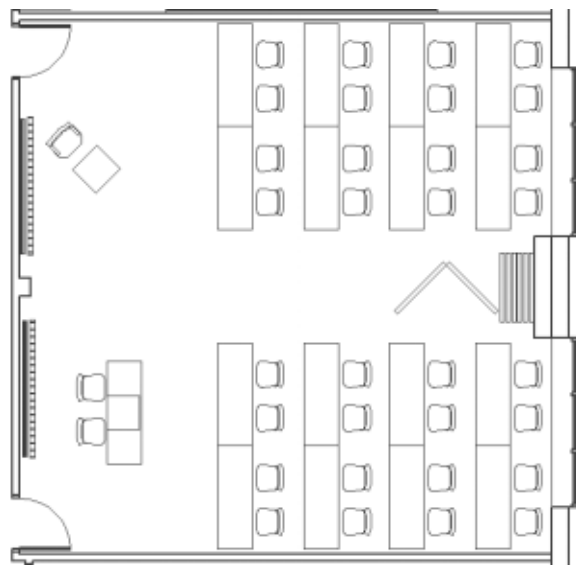


Figure 4-17 Classroom with Operable Partition

4.2.13.4 Room-darkening shades or blinds should be provided for classrooms with windows.

4.2.13.5 Portions of any facility which serve a unit with more than 50 members, such as a school command, will be designed as educational occupancies, and meet applicable code criteria for such occupancy. The library, learning center, COMSEC training, and their support spaces will be part of this educational occupancy area.

4.2.13.6 Space Design Information

General/Code

Size – varies

Occupancy – business unless occupant count requires assembly

Occupancy count – 1 person per 1.9 sq m (20 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'') minimum

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail to protect walls

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc; dual-level switching; provide additional controls at whiteboard

Receptacles – convenience and computer duplexes

Voice/data – two voice/data duplex receptacles

Furniture

Folding tables and stacking chairs

Floor lectern and adjustable stool; option for table-top lectern

Equipment

Map rail, whiteboard, and powered projection screen

Special features or considerations

Consider incandescent downlights with dimmer to 15 fc for room darkening

Provide room-darkening shades for windows

Verify if Tenants require CATV or permanent mount for LCD projection (TV and projector would be Tenant-provided)

Provide sufficient data jacks for computer training, with wire management and appropriate lighting

Chairs with tablet arms are an alternative, but less flexible for other uses

If operable partition, provide storage space

Consider wire management for tables if notebook computer use will be common

4.2.14 Library Reading Room

4.2.14.1 The library reading room, or library, provides the Tenants a place to review training publications and other reading material. It is occasionally used as a meeting or conference room.

4.2.14.2 Library materials are stored in the library storage room.

4.2.14.3 Space Design Information

General/Code

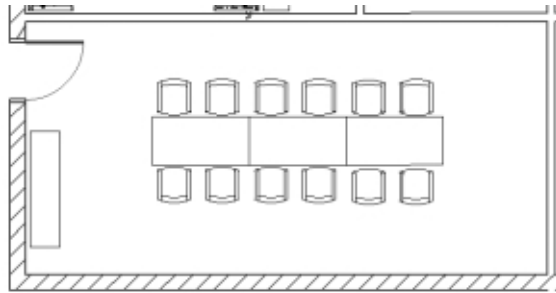


Figure 4-18 Library Reading Room

Size – varies

Occupancy – business, unless 4.2.12.5 above governs

Occupancy count – 1 person per 1.9 sq m (20 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail to protect walls

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience duplexes

Voice/data – telephone and data outlets

Furniture

Tables and low-back armchairs

Bookcases

Whiteboard and map rail
 Video storage cabinet
 Computer workstation with CD storage
Equipment

Special features or considerations

Verify whether Tenants require computer power, voice/data receptacles, whiteboards, etc., for use as a conference or meeting room

4.2.15 Library Storage

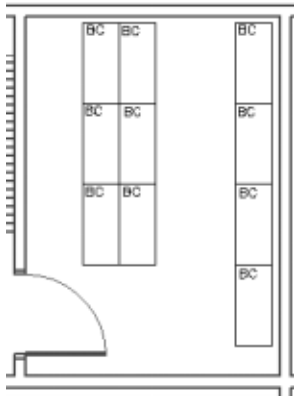


Figure 4-19
Library Storage

4.2.15.1 This space is for the storage of the graphic aids, training modules, bulk training modules and other materials to support the training function. The space should be designed to maximize storage space and shelving.

4.2.15.2 Space Design Information

General/Code

Size – 10 % times Library Reading Room authorization

Occupancy – business

Occupancy count – not occupied; typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – storeroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
 13 degrees C (55 F)

Cooling - none

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 30 fc

Receptacles – convenience receptacles

Voice/data – wall phone

Furniture

Bookcases and/or storage cabinets

Equipment

Open shelving

Special features or considerations

4.2.16 Learning Center

4.2.16.1 The learning center provides space for the individual soldier's military occupational specialty (MOS) training.

4.2.16.2 Individual systems furniture workstations with tall panels on three sides are typically provided; data jacks for each may be required.



Figure 4-20
Learning Center

4.2.16.3 Space Design Information

General/Code

Size – varies

Occupancy – business, unless 4.2.12.5 above governs

Occupancy count – 1 person per 1.9 sq m (20 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience duplex receptacles

Voice/data – telephone and data outlets

Furniture

Systems furniture study carrels

Teacher's table

Low-back chairs with arms

Whiteboard and map rail

Bookcase and lockable storage cabinet

Equipment

Special features or considerations

Verify if Tenants require CATV or permanent mount for LCD
projection (TV and projector would be Tenant-provided)

Verify heat load for any computers

4.2.17 Training Aids Storage

4.2.17.1 This space is for the storage of teaching aids (including A/V equipment), manuals, publications, and models. The designer should verify the types of materials to be stored, and design the space accordingly.

4.2.17.2 Space Design Information

General/Code

Size – 10% times total classroom area authorization

Occupancy – business

Occupancy count – not occupied; typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8")

Floor – VCT

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail

Lockset – storeroom

Mechanical

Heating, occupied – 13 degrees C (55 F); maintained –
13 degrees C (55 F)

Cooling – none

Ventilation – incidental

Electrical

Lighting – 30 fc

Receptacles – convenience duplex receptacles

Voice/data – wall phone

Furniture

Bookcases and/or storage cabinets

Equipment

Shelving

Special features or considerations

Ordinary hazard sprinklers

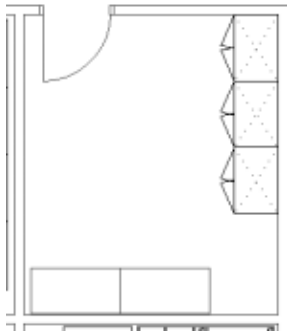


Figure 4-21
Training Aids Storage

4.2.18 COMSEC Training

4.2.18.1 This is a classroom-type space for instruction and updating of secure communication techniques, procedures and information. This space, and the COMSEC Storage space, will rarely be authorized in the future, and should be verified with Using Service COMSEC personnel.

4.2.18.2 If the COMSEC training room houses a safe for the storage of COMSEC materials, the training room must be constructed to show evidence of attempted entry - see 4.2.19.2 below. The walls, ceilings and openings of the room must provide sufficient sound attenuation to preclude inadvertent disclosure of conversation to adjacent non-COMSEC spaces.



Figure 4-22 COMSEC Training and Storage Rooms

4.2.18.3 Space Design Information

General/Code

Size – varies

Occupancy – business, unless 4.2.13.5 above governs

Occupancy count – 1 person per 1.9 sq m (20 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – painted gyp board

Trim –

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc; dual-level switching; provide additional controls at whiteboard

Receptacles – convenience and computer duplexes

Voice/data – two voice/data duplex receptacles

Furniture

Folding tables and mid- or low-back task chairs

Bookcase

Table lectern

Equipment

Map rail, whiteboard, and powered projection screen

Special features or considerations

Consider incandescent downlights with dimmer to 15 fc for room darkening

Provide room-darkening shades for windows

Verify if Tenants require CATV or permanent mount for LCD projection (TV and projector would be Tenant-provided)

Though not a requirement, Tenants normally prefer no windows in this space

4.2.19 COMSEC Storage

4.2.19.1 This space provides storage area for sensitive communication devices. However, a security safe may be substituted and placed within a COMSEC training room. If a safe is utilized, then the room design must provide sufficient space surrounding the safe for circulation and door operation. The safe must be offset from the wall 12 inches in order to open on two sides and swivel, thus requiring a slight increase in floor space. Safes are provided by the Tenants, and weigh approximately 100 psf.

4.2.19.2 The door to a COMSEC storage room must be solid-core wood or hollow metal industrial, lockable and without glazing. The strike plate must be heavy-duty, high-security, and hinge screw length must be sufficient to resist removal by prying. Hinge pins must be within the space, or non-removable. An electro-mechanical lock meeting Federal Specification FF-L-2740 is required.

4.2.19.3 If a storage safe is not incorporated into the COMSEC training room, then the Storage room space must be secure against surreptitious entry; provide gypsum board walls from floor to ceiling, and a gypsum board ceiling, to provide visual evidence of any attempted entry.

4.2.19.4 Air vents, ducts and similar openings that breach the room envelope must be secured to prevent penetration; if greater than 62,000 sq mm (96 sq in), provide hardened steel bar grates or IDS supervision. All openings must be baffled to limit audio or acoustical transmission to non-COMSEC spaces.

4.2.19.5 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – not occupied, typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT

Base – rubber

Walls – painted gyp board

Ceiling – painted gyp board

Trim –

Lockset – storeroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling – none

Ventilation – incidental

Electrical

Lighting – 30 fc

Receptacles – convenience duplex

Voice/data – wall phone

Furniture

Verify with Tenants

Equipment

Any safe(s) will be provided by with the Tenants

Open shelving

Special features or considerations

Ordinary hazard sprinklers

Though not a requirement, Tenants normally prefer no windows
in this space

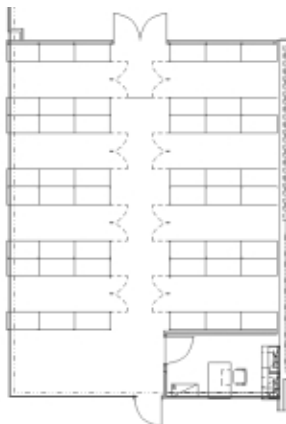


Figure 4-23
Unit Storage with
Supply Office

4.2.20 Unit/Individual Storage

4.2.20.1 This space permits storage and inventory management of organizational equipment, such as clothing, tents, radios, tool sets, etc., in a separate and secure area. The issue and return of organizational equipment is also conducted here, or in the staging area.

4.2.20.2 The unit storage space is typically subdivided into 2450 mm by 3675 mm (8 ft by 12 ft) cages constructed of woven welded wire fabric. See Section 3.5.6 for additional information on cages and shelving. Aisles and vestibules between the secured areas should

allow for efficient circulation and movement of stored equipment.
Circulation space is not included within the total area authorization.

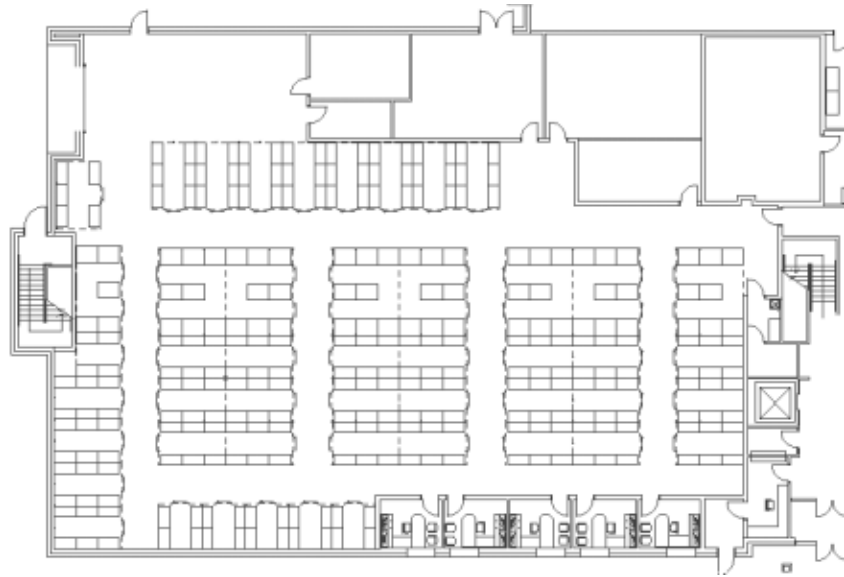


Figure 4-24 Unit Storage with Staging and Supply Offices

4.2.20.3 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – not occupied; typically 1 person per 27.9
sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 3000 mm (10 ft) minimum

Floor – sealed concrete

Base – none

Walls – painted CMU; painted gyp board as an alternative

Ceiling – none; paint structure

Trim –

Lockset – classroom; padlocks at cages

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling – economizer only

Ventilation – one air change per hour

Electrical

Lighting – 30 fc; motion sensors for aisles

Receptacles – convenience duplex in each cage; convenience
duplexes along aisles

Voice/data – none

Furniture

Equipment

Special features or considerations

Ordinary hazard sprinklers

Lights should be located at cage ceilings, as well as in aisles, to provide sufficient light for cages and allow for ease of bulb replacement

Provide padlocks for all cage door hasps

If some portions of unit storage have gyp board walls, consider a plywood wainscot

4.2.21 Staging Area

4.2.21.1 The staging area provides space for issue and return of the units' organizational equipment, and for marshaling and loading for movement off-site.

4.2.21.2 Space Design Information

General/Code

Size – 10% time authorized area for unit storage

Occupancy – business

Occupancy count – not occupied; typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 3000 mm (10 ft) minimum

Floor – sealed concrete

Base – none

Walls – painted CMU; painted gyp board as an alternative

Ceiling – exposed structure, painted

Trim –

Lockset – panic at exit door

Mechanical

Heating – 13 degrees C (55 F)

Cooling – none

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 30 fc

Receptacles – convenience duplex

Voice/data – wall phone

Furniture

Equipment

Special features or considerations

Overhead door to the exterior, typically 3 meters by 3 meters
 If site conditions allow, consider a raised or depressed loading dock at the overhead door
 Ordinary hazard sprinklers

4.2.22 Supply Office

4.2.22.1 These offices are used by the supply officers for administration and training purposes. They should be located to have a view of the unit storage and staging areas, possibly through a window, sidelight or door light, since they have air conditioning and the spaces around them do not. An exterior window overlooking the service drive to the staging area, and any vehicle barrier, are also desirable.

4.2.22.2 There is typically a GFGI safe in at least one supply office; provide a floor anchor, similar to that in the arms vault at the appropriate office(s).

4.2.22.3 Space Design Information

General/Code

Size – 11 sq m (120 sf) each typical

Occupancy – business

Occupancy count – 1 person per single office; shared offices
 2-10

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT ; carpet as an alternative

Base – vinyl

Walls – painted gyp board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat tree; chair rail to protect walls

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
 ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience and computer duplexes

Voice/data – two telephone/data duplexes per workstation

Furniture

Similar to full-time offices above

Equipment

Verify if additional equipment required in some offices

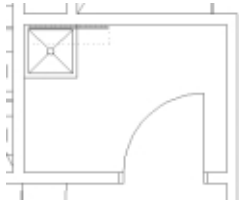
Special features or considerations**4.2.23 Janitorial**

Figure 4-25
Janitorial

4.2.23.1 Janitorial closets provide space, and plumbing, for the cleaning and storage of mops, janitorial supplies and related cleaning equipment. The authorization may be distributed throughout larger or multistory buildings for maintenance convenience.

4.2.23.2 Space Design Information**General/Code**

Size – varies

Occupancy – business

Occupancy count – not occupied; typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete

Base – none

Walls – painted gyp board; painted CMU as an alternative

Ceiling – none; paint structure

Trim –

Lockset – storeroom

Mechanical

Heating – passive, through transfer air

Cooling – passive, through transfer air

Ventilation – ventilate with exhaust at 10 air changes per hour;
maintain negative pressure

Electrical

Lighting – 10 fc

Receptacles – GFI duplex receptacle

Voice/data – none

Furniture**Equipment**

Mop hooks

At least 3 lineal meters (10 ft) of shelving

Special features or considerations

Floor sink with spout with pail hook

Ordinary hazard sprinklers

4.2.24 Flammable Storage: These rooms are rarely provided in training centers; see OMS Flammable Storage, Section 4.3.7 below.

4.2.25 Controlled Waste Storage: These rooms are rarely provided in training centers; see OMS Controlled Waste Storage, Section 4.3.8 below.

4.2.26 Facility Maintenance Storage

4.2.26.1 This space is provided for storage of maintenance equipment and supplies, and general building storage. The authorization may be distributed throughout larger buildings for operational convenience.

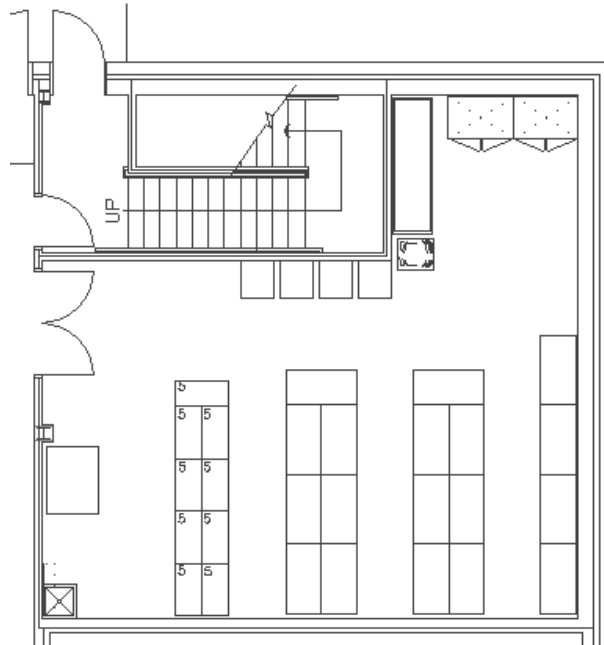


Figure 4-26 Facility Maintenance Storage

4.2.26.2 A portion of this space should be dedicated to recycling, for sustainable design and environmental reasons. This portion should be located near an exterior exit with vehicle access, and a recycling sorting station should be provided.

4.2.26.3 Space Design Information

General/Code

Size – 18.6 sq m (200 sf)

Occupancy – business

Occupancy count – not occupied; typically 1 person per 300 sf

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete

Base – none

Walls – painted gyp board; painted CMU as an alternative

Ceiling – exposed structure, painted

Trim –

Lockset – storeroom

Mechanical

Heating – 13 degrees C (55 F)

Cooling - none

Ventilation – ventilate with exhaust

Electrical

Lighting – 30 fc

Receptacles – convenience duplex receptacles

Voice/data – wall phone

Furniture

Equipment

Shelving and or storage cabinets

Special features or considerations

Ordinary hazard sprinklers

4.2.27 Weapons Training

4.2.27.1 The weapons training space houses a laser engagement skills trainer (EST) to provide simulator-type weapons training. It is similar in design to a classroom, and may occasionally be used as a classroom. A closet or cabinet should be provided in the room for storage of the simulator weapons.

4.2.27.2 The designer should verify the type of EST system to be provided with the Using Service and AR Installation, and obtain the specifications for the system. The EST system is typically Government provided and installed, but the designer will need to develop the proper room layout for the system, as well as appropriate electrical, communications and mechanical systems to support the equipment.

4.2.27.3 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 1.9 sq m (20 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – carpet or athletic flooring; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – 10 L/S (20 cu ft per minute) per person

Electrical

Lighting – 50 fc; incandescent on dimmers for room darkening

Receptacles – convenience and computer duplexes

Voice/data – two voice/data duplex receptacles

Furniture

Equipment

Powered projection screen

Special features or considerations

Provide room-darkening shades for any windows

Verify equipment power or data needs with Tenants

Quiet air distribution

4.2.28 Photo Lab

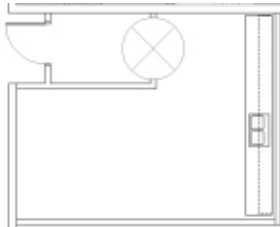


Figure 4-27
Photo Lab

4.2.28.1 The photo lab provides space for photography developing and processing for both operations and training.

4.2.28.2 A rotary darkroom door is required, adequate ventilation for darkroom chemicals, and no return air duct.

4.2.28.3 Space Design Information

General/Code

Size – 23.3 sq m (250 sf)

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT

Base – rubber

Walls – painted gyp board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – office; rotary door from door supplier

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 100W darkroom lights with 15W safelight

Receptacles – convenience duplex receptacles and GFI at wet
areas

Voice/data – wall phone

Furniture

Adjustable stool with back

Equipment

Special features or considerations

Design exhaust for chemicals to be used

Consider undercounter neutralizing basin with stainless steel sink

4.2.29 Band Room – See Appendix G

4.2.30 Medical Section

4.2.30.1 Units with medical sections assigned to them will be authorized a 37.2 sq m (400 sf) space to be used for training and storage. The designers should coordinate layout and furnishing for the space with the Tenants.

4.2.30.2 Space Design Information: This area may house functions similar to office, unit common, or physical exam spaces; see space design information for those functions as appropriate.

4.2.31 Physical Exam Wing – See Appendix I

4.2.32 Secure Compartmented Information Facility (SCIF) - See Appendix H

4.2.33 Soils Testing Lab

4.2.33.1 The space is authorized for units with soils testing functions, and should be located near an exterior door to minimize tracking of dirt by field personnel.

4.2.33.2 Space Design Information

General/Code

Size – 13.9 sq m (150 sf)

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience duplex; GFI duplex above counters

Voice/data – wall phone above counter

Furniture

Verify with Tenants

Equipment

Soils testing equipment by the Tenants

Special features or considerations

Chemical-resistant counter space 2.4 m (8 ft) in length

Two-compartment, chemical-resistant stainless steel sink

Consider filtered return registers

4.2.34 Conference Room

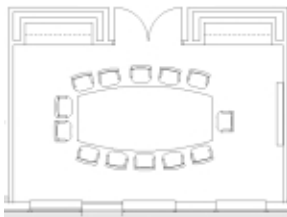


Figure 4-28
Conference Room

4.2.34.1 This space is used for meetings by the Commanding General and/or staff within the general office or headquarters, and is only authorized if there is a General officer in one of the units. It should be near, or in, the General's suite. A higher level of finishes may be appropriate.

4.2.34.2 The conference room must be capable of accommodating 20 people, with good sight lines from all seats and sufficient space for ease of circulation during meetings. If space allows, additional seating can be provided along one or more walls of the room.

4.2.34.3 Space Design Information

General/Code

Size – 55.7 sq m (600 sf)

Occupancy – business

Occupancy count – by number of seats, or 1 person per 1.4 sq m (15 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'') minimum

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board; paneling or vinyl as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc with dual-level switching; incandescent on dimmers

Receptacles – convenience duplexes

Voice/data – voice/data duplex on each wall

Furniture

Conference table with mid- or high-back chairs

Floor lectern with adjustable stool

Credenzas

Equipment

Map rail, whiteboard, powered projection screen

Verify with Tenants if CATV, LCD projection, video conferencing, etc., are desired (TV and projector by Tenants) – OCAR approval is required

Special features or considerations

Built-in credenzas may be appropriate for storage and counter space

4.2.35 Drafting Room

4.2.35.1 This space is used for manual or electronic drafting training and operations, printing, and storage of drawings and media. In most cases it should be set up for one manual and one CAD drafting station. Designer should verify typical drafting practice with Tenants.

4.2.35.2 Space Design Information

General/Code

Size – 23.25 sq m (250 sf)

Occupancy – business

Occupancy count – 2 people

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT; carpet as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
ambient

Ventilation – comply with ASHRAE 62; adequate ventilation for
any printer

Electrical

Lighting – 50 and 100 fc; dual-level switching

Receptacles – convenience and computer duplexes

Voice/data – voice/data duplex each workstation

Furniture

Manual and/or CAD drafting surfaces and seating, similar to
full-time offices above

Drawing storage files

Equipment

CAD terminals, drawing/media storage and printer by Tenants

Special features or considerations

Verify Tenant equipment power/data needs

4.2.36 Physical Readiness Training

4.2.36.1 This space is for the Tenants' physical training (PT); the athletic/training equipment is included in the design, and is provided and installed by the Government as part of the project furniture package.

4.2.36.2 Exterior access should be direct or through a short corridor to allow soldiers to incorporate running into their training. Access should avoid the main entries and more formal spaces in the building.

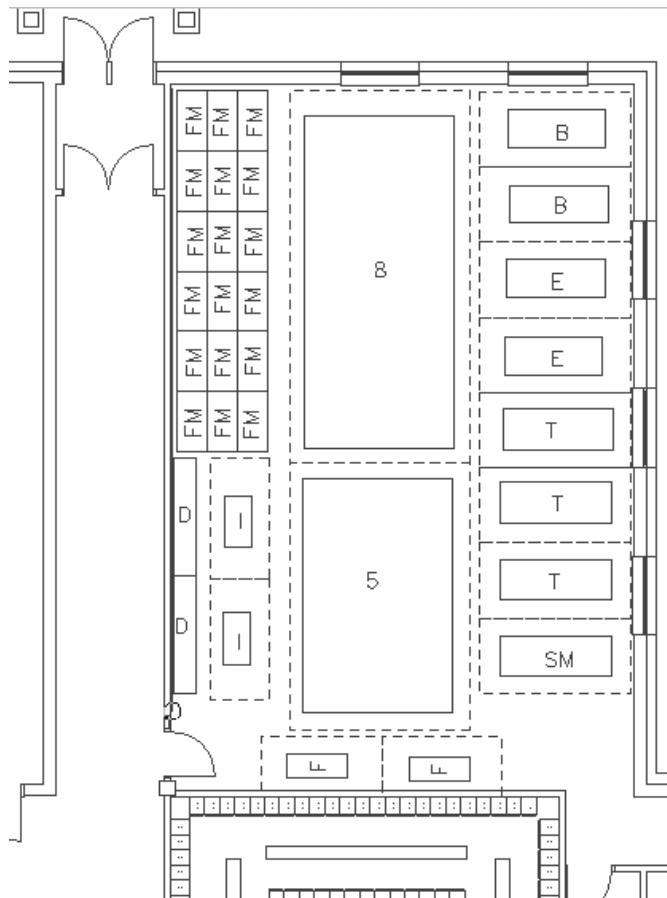


Figure 4-29 Physical Readiness Training

4.2.36.3 A drinking fountain should be located in or near the space.

4.2.36.4 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'') minimum

Floor – cushioned athletic-type flooring; VCT as an alternative

Base – rubber

Walls – painted gyp board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim –

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
ambient

Ventilation – 10 L/S (20 cu ft per minute) per person minimum;
sufficient ventilation for rigorous activity – do not recirculate
to other spaces

Electrical

Lighting – 30 fc

Receptacles – convenience duplex; outlets for powered
equipment

Voice/data – wall phone

Furniture

The exercise equipment is provided as part of the furniture
package

Equipment

AR is developing a matrix of equipment to be provided based
on room size

Mirrors on at least one wall

Exercise bar on the mirrored wall – low and high

Special features or considerations

Verify if Tenants want CATV or data jacks

4.2.37 Army Global Command Control System (AGCCS)

Figure 4-30
AGCCS

4.2.37.1 This space is used for training and operations with secure information. It will have gyp board walls from floor to structure, and a gyp board ceiling to provide evidence of attempted entry.

4.2.37.2 Space Design Information**General/Code**

Size – 13.9 sq m (150 sf)

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8")

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board; painted CMU as an alternative

Ceiling – painted gyp board

Trim –

Lockset – office

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied - 25 degrees C (78 F); maintained - ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience and computer duplex

Voice/data – voice/data receptacle at each workstation

Furniture

Workstations similar to full-time offices

Equipment**Special features or considerations**

Power, conduit and boxes for IDS system to be provided by
the Government

Though not a requirement, Tenants normally prefer no windows
in this space

4.2.38 Distance Learning Center

4.2.38.1 This space is provided, when authorized, to allow delivery of remote training and education resources. An authorization of 74 sq m (800 sf) is provided for each multiple of 12 students, and there may be an associated office for a contract operator/instructor.

4.2.38.2 The space will be similar to a computer learning lab, with voice/data links. The Using Service will provide and install all equipment, hardware and software; the designer must obtain the specifications, and coordinate the design of the mechanical and electrical building systems required to support the space and equipment.

4.2.38.3 Space Design Information - similar to Classroom above; designer must verify whether projection screens, marker boards, map rails and similar accessories are required.

4.2.39 Male and Female Toilets and Showers

4.2.39.1 Toilet rooms should be provided on each floor, and may be distributed throughout larger buildings for personnel convenience. The total fixture count should be based on the tables in Appendix F for the maximum drill weekend. If local codes require more fixtures, review with the Using Service. Modesty screening should be provided at toilet room entries.

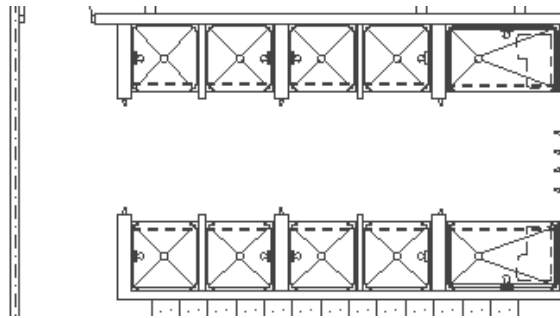


Figure 4-31 Shower Room

4.2.39.2 Shower rooms are provided primarily for weekend drill and physical training purposes, but will also serve some sustainable design goals. Shower rooms should be associated with a toilet room, but only one shower room for each sex should be provided. All showers will be individual units; no gang showers. Standard shower stall is 900 mm by 900 mm; accessible stalls may be 1000 mm by 1000 mm or 900 mm by 1500 mm.

4.2.39.3 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – ceramic tile; open rubber tile at showers

Base – ceramic tile

Walls – ceramic tile; epoxy-painted water-resistant gyp board as an alternative; molded fiberglass as an alternative in shower room

Ceiling – epoxy-painted cement board

Trim –

Lockset – passage or push/pull

Mechanical

Heating - passive, from transfer air

Cooling - passive, from transfer air

Ventilation – Use the largest of 10L/S/SQM, 10 air changes/HR, or ASHRAE 62; negative air pressure.

Electrical

Lighting – 30 fc; showers, 20 fc recessed, wet location, lensed fluorescent downlights

Receptacles – convenience duplex – GFI in wet areas; GFI duplex at sinks

Voice/data – none

Furniture**Equipment**

Towel hooks or racks at showers

Special features or considerations

Commercial grade flush valve fixtures

Corrosion-resistant registers

Consider benches at drying areas

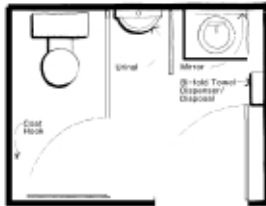
4.2.40 Accessible Unisex Toilet

Figure 4-32
Unisex Toilet

4.2.40.1 With the requirement that all newly constructed toilet rooms be accessible, this space authorization is sometimes lumped with the male and female toilets. It may also be used to provide a toilet in a remote part of a building.

4.2.40.2 Space Design Information: See male and female toilet rooms above.

4.2.41 Male and Female Locker Rooms

4.2.41.1 Locker room space is provided for personnel storage, and for changing of clothing for physical training or during drill weekends.

4.2.41.2 The locker room space authorization may not provide sufficient area for an individual locker for all personnel; in such cases some lockers may be assigned, or all may be available for anyone's use. Full-height, half-height, or a mixture of both may be provided. As a rule of thumb, provide full-height lockers for full-time personnel and those above the rank of Commander, and half-height for the remainder as space allows.

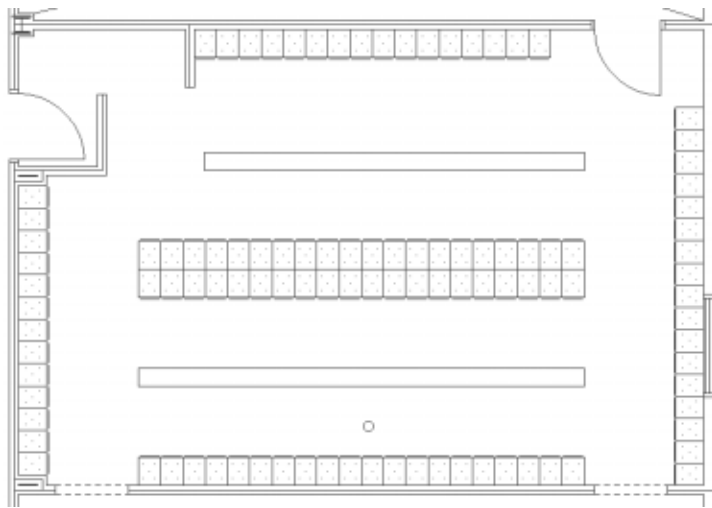


Figure 4-33 Locker Room

4.2.41.3 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8")

Floor – ceramic tile

Base – ceramic tile

Walls – painted gyp board

Ceiling – painted gyp board

Trim –

Lockset – classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
ambient

Ventilation – Use 5 L/S/SQM in locker area and 10L/S/SQM
in shower areas; air pressure to be negative

Electrical

Lighting – 20 fc

Receptacles – convenience duplex - GFI

Voice/data – wall phone

Furniture

Equipment

Benches

Special features or considerations

4.2.42 Vending Alcove

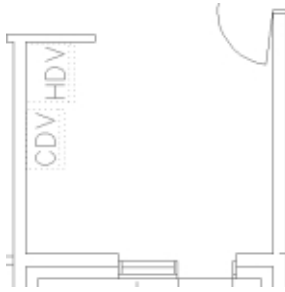


Figure 4-34
Vending Alcove

4.2.42.1 This space is provided for vending machines for the convenience of the Tenants, and is typically located off a corridor or in the break area – occasionally in the assembly hall. Large facilities may justify multiple locations, but the space will have to come out of hide.

4.2.42.2 Space Design Information

General/Code

Size – 4.5 sq m (48 sf)

Occupancy – business

Occupancy count – not occupied; typically 1 person per
28 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – VCT; carpet as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – none

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained –
ambient

Ventilation – comply with ASHRAE 62; return air to remove
heat from vending machines

Electrical

Lighting – 20 fc

Receptacles – dedicated 20A for each vending machine

Voice/data – none

Furniture

Equipment

Vending machines are by the Tenants

Special features or considerations

4.2.43 Break Area

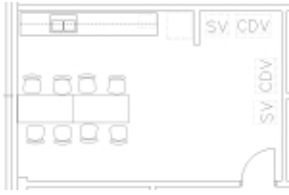


Figure 4-35
Break Area

4.2.43.1 This space is provided for break and meal activities; it may occasionally be used as a meeting or training space. The Using Service may authorize up to 37 sq m (400 sf) of additional space for family support/retention purposes.

4.2.43.2 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 1.9 sq m (20 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'')

Floor – carpet; VCT as an alternative

Base – rubber

Walls – painted gyp board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail

Lockset – passage

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62; exhaust with local control for microwave

Electrical

Lighting – 50 fc

Receptacles – convenience duplex; dedicated 20A for appliances; GFI duplex at sink

Voice/data – wall-mounted phone

Furniture

Folding tables and stack chairs

Bulletin board

White board

Equipment

Special features or considerations

Refrigerator and microwave are part of construction contract

Counter with upper and lower cabinets and two-compartment sink

Verify with Tenants if they will provide large coffeemaker

4.2.44 Mechanical

4.2.44.1 Mechanical space for HVAC equipment and ductwork will be distributed through the building for efficient operation of the mechanical systems.

4.2.44.2 The main mechanical space should have double doors to the exterior for convenient access for maintenance and repair.

4.2.44.3 Space Design Information

General/Code

Size – 8% times authorized bldg. functional area or as required

Occupancy – business

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – concrete, sealed

Base – none

Walls – sealed and painted CMU; painted gyp board as an alternative

Ceiling – none, paint structure

Trim –

Lockset – storeroom; entrance at exterior door

Mechanical

Heating – 13 degrees C (55 F)

Cooling – sufficient to remove excess equipment heat

Ventilation – sufficient to satisfy combustion air and cooling requirements; one air change per hour min.

Electrical

Lighting – 30 fc

Receptacles – convenience duplexes

Voice/data – wall phone

Furniture

Equipment

Special features or considerations

Connections to flow switches, tamper switches, and fire alarm

Ordinary hazard sprinklers

Floor drains for relief valves, hose bibb, eyewash if water treatment chemicals in room

Power and data connections for computer if energy management control system

4.2.45 Electrical

4.2.45.1 The authorization for electrical space is intended to provide the main electrical distribution room, but electrical closets or panels may be located throughout the building for efficient operation of the facility. Space for the closets will have to come out of hide.

4.2.45.2 It is preferred that the main electrical room be dedicated, and not share space with mechanical equipment.

4.2.45.3 Space Design Information

General/Code

Size – 33.5 sq m (360 sf)

Occupancy – business

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – concrete, sealed

Base – none

Walls – sealed and painted CMU; painted gyp board as an alternative

Ceiling – none, paint structure

Trim –

Lockset – storeroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling – none

Ventilation – to maintain suitable temperatures for equipment

Electrical

Lighting – 30 fc

Receptacles – convenience duplexes

Voice/data – wall phone

Furniture

Equipment

Electrical service equipment

Special features or considerations

Main ground bar

Ordinary hazard sprinkler

Avoid routing piping above electrical equipment

4.2.46 Telephone

4.2.46.1 The main telephone service room should also be a dedicated space, not shared with mechanical or electrical equipment. This is the utility service entrance, and the demarcation point between utility and Government telephone system ownership.

4.2.46.2 Space Design Information

General/Code

Size – 9.3 sq m (100 sf)

Occupancy – business

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – concrete, sealed

Base – none

Walls – sealed and painted CMU; painted gyp board as an alternative

Ceiling – none, paint structure

Trim –

Lockset – storeroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling – to maintain suitable temperatures for equipment, possibly continuous

Ventilation – 10 L/S (20 cu ft per minute) per person

Electrical

Lighting – 30 fc

Receptacles – convenience duplexes; dedicated 20A circuits for telephone equipment

Voice/data – wall phone

Equipment

Special features or considerations

4.2.47 Circulation

4.2.47.1 Typical widths for main corridors are 1800 mm and 2400 mm (6 ft and 8 ft) to allow two people abreast to circulate comfortably without body contact. Secondary corridors may be reduced in width.

4.2.47.2 Corridors should be planned to be a maximum of 150 feet straight in one direction. Consider changing corridor direction and providing views to adjacent spaces or an exterior scene. Permanent wall-mounted fixtures such as drinking fountains or fire extinguishers must not project into the corridor.

4.2.47.3 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8'") minimum

Floor – VCT; carpet as an alternative in more formal and admin areas

Base – rubber

Walls – painted gyp board with hard finish wainscot; painted, glazed or burnished CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – wall guardrail and corner guards

Lockset – varies; may include hold-opens

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); cooling, maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 20 fc

Receptacles – convenience duplex

Voice/data – pay phones if requested by Tenants

Furniture

If space allows, seating areas with lounge chairs

Trophy cases, display cases, bulletin boards

Equipment

Special features or considerations

Electric water coolers for each floor, minimum

Consider concealed sprinkler heads for esthetics

AR does not want vinyl wall covering in circulation spaces due to difficulty of repair

4.3 OMS Building

4.3.1 Shop Office

4.3.1.1 The shop office provides space for the performance of administrative functions relating to dispatch records, maintenance records and scheduling.

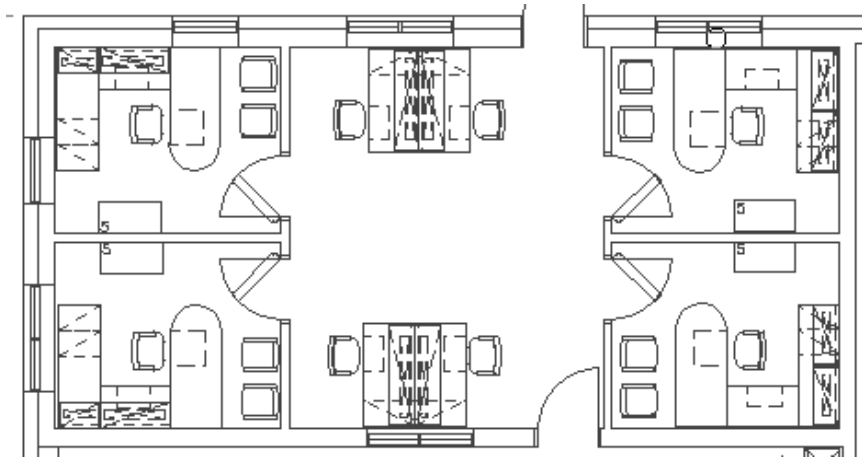


Figure 4-36 Shop Office

4.3.1.2 The location of the shop office should provide maximum visibility of workbays, and Tenants generally desire that the offices overlook the workbays, either through a window or a door. The designers must be aware of the requirements of NEC Article 511 requiring that communicating areas adjacent to workbays be classified as Class 1 locations. A nonoperable window is preferable for visibility. Any door should not open directly into the workbays, unless the requirements of NEC 511 are met.

4.3.1.3 NFPA 101 requires that no other spaces exit through the workbays; if the office area requires two exits, an exit corridor must be provided as well as a direct exit.

4.3.1.4 Access must be provided from the shop office to the workbay area as well as to the exterior of the building.

4.3.1.5 Space Design Information

General/Code

Size – varies

Occupancy – business

Occupancy count – 1 person per 9.3 sq m (100 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 2600 mm (8' - 8")

Floor – VCT; carpet as an alternative in private offices

Base – rubber

Walls – painted gyp board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat tree and chair rail

Lockset – office or classroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling, occupied – 25 degrees C (78 F); maintained – ambient

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc

Receptacles – convenience and computer duplexes

Voice/data – two voice/data duplexes at each workstation

Furniture

Same as full-time offices above – no electrical within 475 mm (18 in) of floor

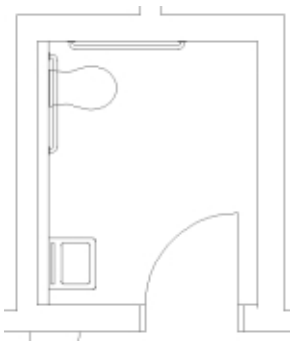
Equipment**Special features or considerations**

Figure 4-37
Unisex Toilet

4.3.2 Unisex Toilet

4.3.2.1 The toilet authorization for the OMS is typically sufficient for only one toilet. An accessible toilet is not required, due to an exception in UFAS. Provide a urinal, toilet and sink.

4.3.2.2 Space Design Information: See Section 4.2.38 above.

4.3.3 Tools and Parts Storage Room

4.3.3.1 This space is the storage and issue area for spare parts and tools, especially mechanics' tool sets and organizational maintenance sets.

4.3.3.2 The Tenants typically want the tools and parts areas of this room separated by caging or a hard wall, and may want the two areas further divided by caging for an individual unit's use. The designer should verify whether a Dutch door with shelf, or sliding window, is required for issue of parts and tools, and whether one or more

workstations are desired in the room.

4.3.3.3 Steel shelving units are typically provided under the construction contract, and some floor space is typically left open for storage of larger items. The designer should verify the Tenants' shelving requirements.

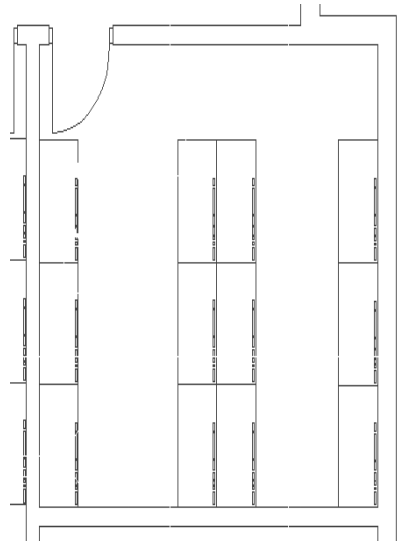


Figure 4-38 Tools and Parts Storage Room

4.3.3.4 Space Design Information

General/Code

Size – 8.9 sq m (96 sf) per authorized workbay

Occupancy – low hazard storage

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete

Base – none if CMU; rubber if gyp board

Walls – painted CMU; painted gyp board as an alternative

Ceiling – exposed structure, painted

Trim – consider plywood wainscot to protect walls

Lockset – storeroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling - none

Ventilation – ventilate if workstation located here

Electrical

Lighting – 30 fc

Receptacles – convenience duplexes; computer duplex if automated inventory

Voice/data – wall voice receptacle; data receptacle if automated inventory

Equipment

Open shelving

Special features or considerations

Ordinary hazard sprinklers

4.3.4 Storage Room

4.3.4.1 This space is provided for storage of ancillary equipment issued with vehicles, including operators' vehicle maintenance tools, canvas, canvas bows, seats, sideboards, etc. It is best located adjacent to tools and parts storage, and may be divided with caging for units.

4.3.4.2 Space Design Information**General/Code**

Size – 8.9 sq m (96 sf) per authorized workbay

Occupancy – low-hazard storage

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete

Base – none if CMU; rubber if gyp board

Walls – painted CMU; painted gyp board as an alternative

Ceiling – exposed structure, painted

Trim – consider plywood wainscot to protect walls

Lockset – storeroom

Mechanical

Heating – 13 degrees C (55 F)

Cooling – none

Ventilation – ventilate if workstation located here

Electrical

Lighting – 30 fc

Receptacles – convenience duplexes; computer duplex if automated inventory

Voice/data – wall voice receptacle; data receptacle if automated inventory

Furniture

Equipment

Open shelving

Special features or considerations

Ordinary hazard sprinklers

4.3.5 Special Equipment Alcove

4.3.5.1 The Tenants typically have equipment such as tire changers, balancers, etc., which is in frequent use, but cannot be located within the maintenance bays. An authorization of 18.6 sq m (200 sf) is provided to accommodate this equipment. The designer should locate this alcove off the workbay area where this equipment can be permanently located, convenient to the workbays and with sufficient space for operation of the equipment.

4.3.5.2 Space Design Information: Refer to the space design information for the workbays; this space is treated as an integral part of the workbays, and the space design should be the same.

4.3.6 Battery Room

4.3.6.1 Battery rooms are no longer authorized for an OMS; for exceptions, see information at Section 4.5.

4.3.7 Flammable Storage

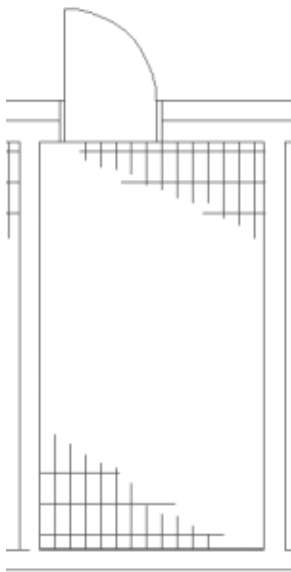


Figure 4-39
Flammable Storage

4.3.7.1 This space is provided for storage of petroleum-based lubricants, paints, solvents, etc. for use in the OMS. Due to the volatile nature of the contents, it will have exterior access only, and CMU wall to structure or a concrete ceiling.

4.3.7.2 The room should have a depressed well under a metal grate floor for collection of any spills: no drain. The well should be sloped to allow convenient suction of spills at a low point. The well should be capable of containing 150% of the stored materials; verify likely amount of stored materials with Tenants.

4.3.7.3 Some steel shelving is typically provided, with some floor area left open for larger containers.

4.3.7.4 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete below metal grate

Base – none

Walls – painted CMU

Ceiling – none; paint structure

Trim –

Lockset – entrance

Mechanical

Heating – sufficient to avoid freezing

Cooling - none

Ventilation – separate, continuous explosion-proof ventilation interlocked with room lighting, or door louvers

Electrical

Lighting – 10 fc; minimum of two explosion-proof incandescents on exterior weatherproof pilot-lighted exterior switch

Receptacles – none

Voice/data – none

Equipment

Open shelving

Special features or considerations

Extra hazard sprinklers; dry system in north

Open grating aluminum flooring over spill-collection basin

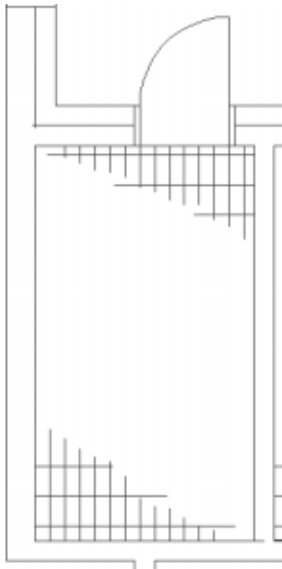


Figure 4-40
Controlled Waste
Storage

4.3.8 Controlled Waste Storage

4.3.8.1 This space is provided for storage of waste materials or items for environmental protection, while awaiting recycling or other disposal. Due to the nature of the contents, it will have exterior access only, and CMU wall to structure or a concrete ceiling.

4.3.8.2 The room should have a depressed well under a metal grate floor for collection of any spills. The well should be sloped to allow convenient suction of spills at a low point: no drain. The well should be capable of containing 150% of the stored materials; verify likely amount of stored materials with Tenants.

4.3.8.3 Some steel shelving is typically provided, with some floor area left open for larger containers.

4.3.8.4 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete below metal grate

Base – none

Walls – painted CMU

Ceiling – none; paint structure

Trim –

Lockset – entrance; code may require panic

Mechanical

Heating – sufficient to avoid freezing

Cooling - none

Ventilation – separate, continuous explosion-proof ventilation interlocked with room lighting, or door louvers

Electrical

Lighting – 10 fc; minimum of two explosion-proof incandescents on exterior weatherproof pilot-lighted exterior switch

Receptacles – none

Voice/data – none

Equipment

Open shelving

Special features or considerations

Extra hazard sprinklers; dry system in north

Open grating aluminum flooring over spill collection basin

4.3.9 Workbays

4.3.9.1 The workbay provides space for training and for the performance of services and repairs of assigned equipment (mobile and stationary). There are two basic types of workbay configurations, single access and drive-through double access. Drive-through workbays should be included whenever possible; two workbays end to end, with an overhead door at the opposite ends.

4.3.9.2 The workbays are the heart of the OMS. The other support areas are normally located as closely adjacent to the workbays as possible under the exiting requirements of NFPA 101; consider locating most of them off a corridor into the workbay, with the other end of the corridor as their exit path. The functional layout should allow for the future addition of workbays, if possible.

4.3.9.3 Water runoff from workbay cleaning operations will be collected in a trench drain located inside the overhead door and emptied into a grease/oil separator connected to the sanitary sewer. Designer should verify environmental requirements for drainage with AR Installation, and local codes and regulations

4.3.9.4 Welding is typically not authorized in an OMS. If authorized, a code-compliant hood or room must be provided. Comply with NEC 511 and NFPA 51B; a welding room would require double doors with a vestibule between if it opens to the workbays. If welding is not authorized, exterior outlets are sometimes provided for occasional welding operations, away from any doors. The designer should verify power requirements.

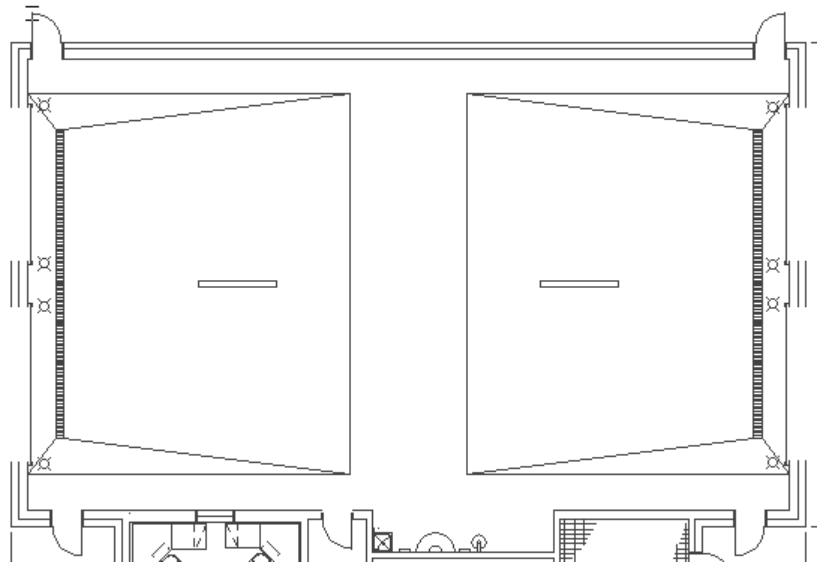


Figure 4-41 Workbays

4.3.9.5 The workbays typically are taller than the other OMS supporting spaces with a 4.3 m (14 ft) minimum clear height, resulting in differing roof and wall heights for the two areas. In instances where it becomes more economical to construct the OMS with one roofline, use of the area above the ancillary shop spaces for additional storage and mechanical equipment space is discouraged. The designer must verify required clear workbay height with Tenants' vehicle sizes.

4.3.9.6 The basic dimensions of the workbays are 6.1 m (20 ft) wide by 12.2 m (40 ft) long, which includes circulation space along the 6.1 m width. End workbays are authorized an additional 1.2 m (4 ft) of width on their outboard side to provide circulation space. Trench drains are located approximately 1500 mm (5 ft) from the exterior wall, and the floor slopes 75 mm (3 in) to them as shown above.

4.3.9.7 Concrete aprons serve as outdoor workbays, especially for portable hydraulic hoists, and will be 11 m (36 ft) in depth.

4.3.9.8 Vehicle exhaust drops should be located in each workbay. The drops must be of sufficient flexibility and length, and have appropriate terminations to adequately serve the units' vehicles.

4.3.9.9 Designers should pay particular attention to coordination of systems in the space above the workbays. Lights, space conditioning, exhaust drops, power/light reels, overhead doors, etc., compete for space and must be coordinated for space functionality.

4.3.9.10 Overhead workbay doors are typically 4900 mm by 4300 mm (16 by 14 ft). Provide protective bollards inside and outside of overhead door jambs and at corners of OMS buildings adjacent to traffic paths. Provide powered door operation.

4.3.9.11 An air sweep exhaust for the entire work area should be located 460 mm (18 in) above the floor.

4.3.9.12 An air compressor will be contractor-furnished and installed, and will normally be located in the mechanical room with a quick disconnect outlet in each workbay.

4.3.9.13 A service sink, drinking fountain, and eyewash/deluge shower will be provided in the workbay area. Hose bibbs will be provided in each workbay, contractor-furnished and installed.

4.3.9.14 Overhead cranes are not typically authorized for an OMS; see 4.5.2 for overhead crane information, if authorized.

4.3.9.15 Space Design Information

General/Code

Size – varies; base workbay is 74.3 sq m (800 sf)

Occupancy – repair garage; typically no fueling or welding

Occupancy count – 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 4300 mm (14 ft) minimum clear

Floor – sealed concrete

Base – none

Walls – painted CMU

Ceiling – none, paint structure

Trim –

Lockset – entrance

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained –
13 degrees C (55 F)

Cooling – none

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 50 fc; pendant 250W pulse start halide with wide
distribution and acrylic lens

Receptacles – GFI duplex receptacles at columns and on walls
at 1220 mm (48 in) AFF

Voice/data – voice/data duplexes in each bay

Furniture**Equipment**

Trouble light/power reel in each bay

Workbenches

Special features or considerations

Carbon monoxide detectors

Ordinary hazard sprinklers

Design grade-supported slabs to comply with TM 5-809-12

Underfloor heating is the norm for maintenance bays in locations
with more than 5,000 heating degree days per year, and
should be coordinated with concrete slab on grade

4.3.10 Mechanical/Custodial

4.3.10.1 This space is provided for the location of electrical panels, telephone equipment, water heaters, heating equipment, air compressors, and storage of maintenance equipment and supplies. Codes and Tenant preference may require separate rooms for telephone and/or electrical systems. Access may be exterior only.

4.3.10.2 Space Design Information

General/Code

Size – varies

Occupancy – low hazard storage

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – concrete

Base – none

Walls – painted CMU; painted gyp board as an alternative

Ceiling – none; paint structure

Trim –

Lockset – entrance

Mechanical

Heating – 13 degrees C (55 F)

Cooling – none

Ventilation – to provide combustion air

Electrical

Lighting – 30 fc

Receptacles – convenience duplex

Voice/data – none

Equipment

Air compressor for workbay

Open shelving

Special features or considerations

Connections to flow switches, tamper switches, and fire alarm

Power and data connections for computer if energy management control system

Ordinary hazard sprinklers

Floor drains for relief valves, hose bibb, eyewash if water treatment chemicals in room

Verify with Tenants any special connections for equipment

4.3.11 Information Technology

4.3.11.1 This space authorization is required to provide an IT hub for the OMS, with connection typically back to the training center network operations center. This may be part of a telephone room, and is sometimes located within the shop office in an out-of-the-way corner.

4.3.11.2 Designer should coordinate the equipment requirements with the AR Installation and Tenants.

4.3.11.3 Space Design Information

General/Code

Size – 16 sq m (280 sf)

Occupancy – business

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – VCT, static dissipative

Base – rubber or vinyl

Walls – painted gyp board

Ceiling – exposed structure, painted

Trim –

Lockset – storeroom

Mechanical

Heating, occupied – 20 degrees C (68 F); maintained – 13 degrees C (55 F)

Cooling – to maintain suitable temperatures for equipment, possibly continuous

Ventilation – comply with ASHRAE 62

Electrical

Lighting – 30 fc

Receptacles – convenience duplexes; dedicated 20A circuits for servers

Voice/data – wall phone

Furniture

Equipment

Computer racks are part of the construction contract

LAN equipment and connections by the AR Installation

Special features or considerations

Some units have separate computer systems for OMS operations

4.4

Unheated Storage Building (UHS)

4.4.1 An unheated storage building is provided for storage of equipment and supplies that do not require a controlled climate. These buildings are typically simple pre-engineered metal buildings, but may be designed to match other buildings in the facility if the project budget allows. One or more personnel doors and one or more overhead doors are typical; the standard overhead door size is 2450 mm by 2450 mm (8 ft by 8 ft). These buildings are not considered warehouses, and are not typically designed with recessed truck docks, or to accommodate material handling equipment.

4.4.2 The interior space is also typically quite simple: concrete floor, unfinished walls, service-level lighting and convenience duplex outlets. A telephone may be provided for communications with the other buildings. No offices or other spaces are included. Normally, no sprinklers, plumbing, and HVAC are provided.

4.4.3 The Tenants may wish to divide the space with caging to provide space for individual units, and may also want individual doors. Storage cages and shelving may also be required, along with open space for palletized storage.

4.4.4 The space allocation for unheated storage is sometimes added to another building for functionality reasons. If this occurs, this space remains without climate control. Designers should be aware that the other building may require fire sprinklers, and must address separation of the spaces accordingly.

4.4.5 If a pre-engineered building is used, provide applicable design loads and prepare performance specification. Structural design will incorporate details and loads from any pallet rack systems. Special consideration should be made for frost protection in cold weather geographical areas.

4.5 AMSA

4.5.1 General

4.5.1.1 The ancillary shop areas for AMSA, such as the shop offices, tool rooms, flammable storage, battery rooms, mechanical rooms, custodial areas and workbays are similar to those of OMS in functional requirements; therefore, refer to the OMS individual space criteria in Section 4.3 above for these AMSA spaces.

4.5.1.2 An AMSA, due to its full-time staff and maintenance mission, is also authorized spaces and equipment not found in an OMS. These additional spaces are described below.

4.5.2 AMSA Workbays

4.5.2.1 There is one major difference between the OMS and AMSA (or DS/GS) workbays: an AMSA (or DS/GS) is authorized a crane. The crane typically covers the majority of two workbays; it may not cover them entirely, but covers the bulk of the workspace.

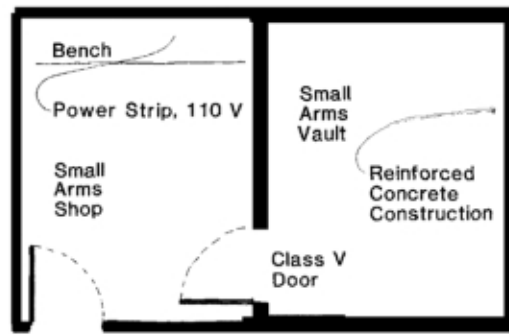


Figure 4-42 Small Arms Repair Room with Arms Vault

4.5.2.2 The typical crane is a 6.8 metric ton (7.5 ton), single-girder, top-running crane, equipped with a low-headroom, bottom-running trolley with a wire rope hoist. Structural columns with a supporting haunch must be strategically placed to support the crane girder and rail, which supports the bridge crane. The maximum span of the bridge crane itself will be 18,000 mm (60 ft). It is not economically feasible to span the entire 24,000 mm (80 ft) width of the building. Verify clear hook height required with the Tenants, based on the equipment they service. Some units servicing heavier equipment may require a crane with a larger lifting capacity.

4.5.2.3 The crane will be Class C, moderate service CMAA Duty Classification. Provide push button pendant festoon. Minimum and maximum speeds: hoist .076 m/s (15 fpm) and .127 m/s (25 fpm); trolley .229 m/s (45 fpm) and .381 m/s (75 fpm); and bridge .382 m/s (75 fpm) and .762 m/s (150 fpm). Provide warning horn and light when crane is in motion, and warning alarm and light when crane malfunctions or is overloaded.

4.5.2.4 Space Design Information – see OMS workbays, Section 4.3.9 above. See 4.3.9.4 if welding is authorized.

4.5.3 Small Arms Shop and Vault

4.5.3.1 The shop and vault provide space for the repair and storage of small arms such as rifles, machine guns, grenade launchers, etc. The shop should be located adjacent to the arms vault with access to the vault through the shop, similar to the armorer's and arms vault spaces in a training center.

4.5.3.2 A 110 volt continuous power strip should be provided over the work benches.

4.5.3.3 Construction of the vault must be in compliance with AR 190-11. See Section 4.2.11 for additional vault design information.

4.5.3.4 Space Design Information: Refer to arms vault and armorer's room, Sections 4.2.11 and 4.2.12 above. Provide air conditioning.

4.5.4 Supply

4.5.4.1 This space is provided for the storage, receipt and issue of spare parts for AMSA maintenance and operations. It is a part of the tools and parts room, but should be separated from the tools and parts with standard caging.

4.5.4.2 Space Design Information: Same as OMS tools and parts storage, Section 4.3.3 above.

4.5.4.3 A supply office may be provided adjacent to the supply space. The design criteria are the same as those for an OMS office space, Section 4.3.1 above.

4.5.5 Electrical/Communications Repair

4.5.5.1 This space is provided for the repair and storage of supported units' communications equipment.

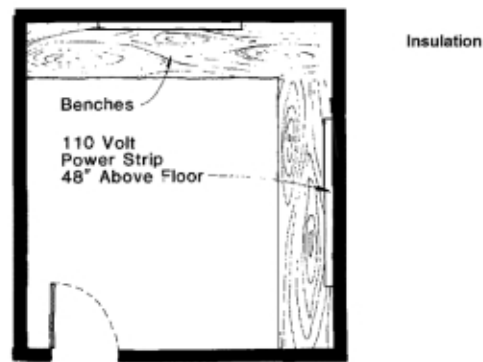


Figure 4-43 Elec/Comm Repair

4.5.5.2 Space Design Information: Same as armorer's room, Section 4.2.12 above. Provide air conditioning, provide continuous 110V power strip above workbench, and provide a 28-volt DC power plug strip above the workbench for testing equipment after repairs. Provide static-dissipative VCT flooring.

4.5.6 Breakroom

4.5.6.1 This is a multipurpose space for employee relaxation and meals, and to conduct classroom training activities. It should be located adjacent to the toilets and locker rooms, and should include a drinking fountain.

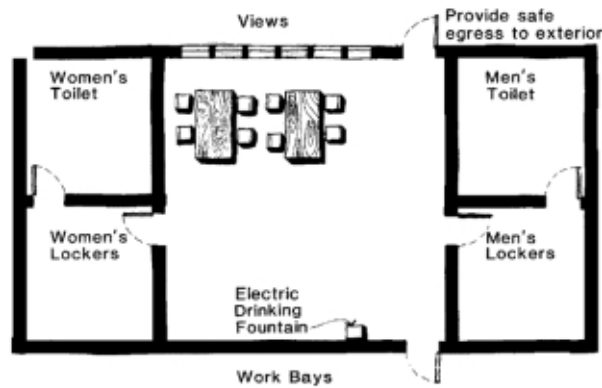


Figure 4-44 Break Area

4.5.6.2 Space Design Information: Same as training center break area, Section 4.2.42 above.

4.5.7 Male and Female Locker Rooms

4.5.7.1 These spaces will be used by the full-time, civilian maintenance technicians to store street clothing and to change. They should be located with the breakroom and toilets.

4.5.7.2 One locker will be provided for each authorized AMSA position. Designer should consider providing a few extra lockers for each sex to anticipate staff turnover. The lockers should be heavy-duty steel athletic-type, 380 mm wide by 460 mm deep by 1830 mm tall (15 in by 18 in by 72 in).

4.5.7.3 Space Design Information: Same as training center lockers, Section 4.2.40 above.

4.5.8 Male and Female Toilets and Showers

4.5.8.1 Toilets and showers are provided for the use and convenience of the personnel, and should be located with the breakroom and lockers.

4.5.8.2 Space Design Information: Same as training center toilets and showers, Section 4.2.38 above.

4.5.9 Battery Room

4.5.9.1 This space is provided for servicing, charging, and storage of lead-acid batteries. The designer may find that the Tenants no longer service or charge batteries, and simply store them for short periods before exchange or after delivery. Unless otherwise directed by the Using Service, the room should be designed for full battery operations, in case the situation changes in the future. If this space opens into the workbays, the requirements of NEC 511 apply.

4.5.9.2 Battery shelving is provided under the construction contract, and is typically of redwood, cedar or fiberglass, along the side of the room opposite the door. The shelves are usually tiered from front to back, with the lowest shelf at 500 mm (18 in) AFF.

4.5.9.3 A hose bibb will be provided. No floor drain will be provided.

4.5.9.4 Provide duplex receptacles above the benches for battery charging. A sail switch is required to ensure that battery charging cannot occur without proper ventilation.

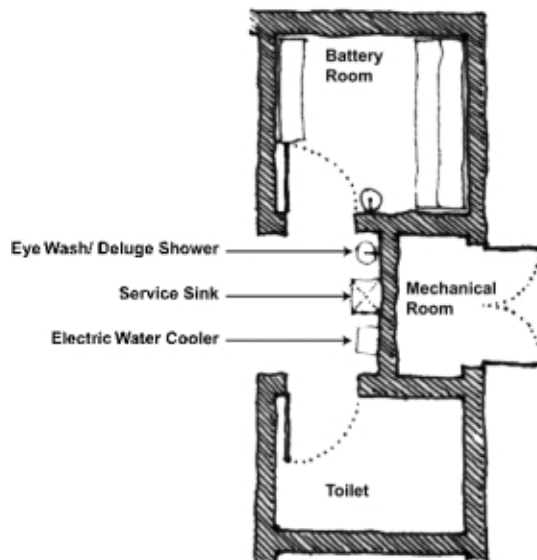


Figure 4-45 Battery Room and Toilet

4.5.9.5 Provide eyewash/deluge showers inside and outside the door to the room.

4.5.9.6 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage

Occupancy count – not occupied; typically 1 person per 27.9 sq m (300 sf)

Architectural/Interiors

Minimum STC rating – 40

Ceiling height –

Floor – sealed concrete

Base – none

Walls – painted CMU

Ceiling – none, paint structure

Trim –

Lockset – storeroom

Mechanical

Heating – 13 degrees C (55 F)

Cooling – none

Ventilation – explosion proof exhaust to keep hydrogen gas below 5% concentration; consider a hood above batteries

Electrical

Lighting – 20 fc; minimum of two explosion-proof incandescent on pilot-lighted switch outside room

Receptacles – see special features below

Voice/data – none

Furniture

Equipment

Battery shelving

Special features or considerations

Continuous metal raceway with duplex receptacles at 600 mm (24 in) o.c. above battery racks; sail switch connection to ventilation

Ordinary hazard sprinklers

4.6

Direct Support and General Support (DS/GS)

4.6.1 Direct support and general support (DS/GS) maintenance shops will be built only in support of a unit whose mission is DS/GS maintenance. This level of maintenance activity requires more specialized repair, calibration equipment, and highly skilled repairmen. The missions of specific units vary widely. Consequently, a standard design or even a functional space breakdown has not been developed for DS/GS units.

4.6.2 The project documents will define the specific functional area breakdown and ancillary support equipment required for each DS/GS shop

building. The Tenants will provide a precise definition concerning the various maintenance functions of the DS/GS shop and the actual and perceived relationship between the various functions. The functional and physical requirements of the support facilities must be fully defined to ensure correct design and layout.

4.6.3 DS/GS shops are rarely built separately from a United States Army Reserve Center (USARC); therefore, they will normally be built as a part of an OMS or as an addition to an existing OMS. If the facility's site has sufficient area, it may be more functional and economical to build a separate structure.

4.6.4 The nature of the DS/GS shop operations require that all space be exclusive use. Therefore, the DS/GS shop will usually only share a central HVAC unit, a common wall, access/egress and toilet facilities with the OMS or OMS/AMSA.

4.6.5 Support facilities for a DS/GS will be defined in the project documents for a specific project and may include a small MEP area, outside storage, covered storage and an adjacent concrete apron pad for location and operation of mobile maintenance shop trucks and vans. The design criteria for standard areas such as the shop office, tool room, battery room, flammable storage and workbays are the same as those for the OMS. Special maintenance areas, such as tent repair, sheet metal shop, paint shop, welding shop, etc., will be provided as required by the project documents.

4.7 DEPMEDS

4.7.1 A DEPMEDS area is an exterior space allocated for Reserve units with Deployable Medical Sets: collapsible structures used to create a medical theater in the field. For mission essential equipment training (MEET), an area of 3,720 sq m (40,000 sf) is authorized.

4.7.2 The DEPMEDS area is typically provided with an aggregate surface, security fencing, and exterior lighting similar to the MEP. The security fence should have both personnel and vehicle gates. Utility provisions typically include power, water, stormwater provisions to drain the area, and a graywater connection to a sanitary sewer. The Tenants will provide and install grounding rods for their equipment as a part of their training. All the DEPMEDS equipment is provided by the Tenants.

4.8 Warehouse

4.8.1 An AR warehouse (WHS) is a building to accommodate an AR unit with a full-time supply function in support of other AR units or maintenance shops. No standard design or functional space breakdown has been developed for warehouses, as their size and specific functions and capabilities may vary.

4.8.2 The project documents will define the specific functional area breakdown and ancillary support equipment required for each warehouse. The Tenants will provide further definition concerning the various storage and supply functions of the warehouse, and the actual and perceived relationship between the various functions. The functional and physical requirements of the support facilities must be fully defined to ensure correct design and layout.

4.8.3 Unlike an unheated storage building, a warehouse is likely to have raised or depressed loading docks with typical dock accessories such as dock levelers, dock bumpers, and seals. The dock and dock doors should be sized to accommodate the vehicles which will utilize it, as well as material handling equipment, if the Tenants have such equipment.

4.8.4 Shelving, pallet racking, and similar systems should be provided to fit the Tenant's needs.

4.8.5 A Hands-on-Training Warehouse (HOT WHS) is for training AR units to support ongoing Army missions or activities. As with a warehouse, the designer must work with the Tenants to define the program for the HOT WHS.

Appendix A

Acronyms and Military Rank Designations

A.1

AR frequently uses acronyms. Here is a list of those most commonly used. See website <http://www.dtic.mil/doctrine/jel/doddict>

A/E	Architect/engineering
AC	Asphalt concrete
ACT	Acoustical ceiling tile
ADA-AG	Americans with Disabilities Act - Accessibility Guidelines
AFFF	Aqueous Film Forming Foam
AGCCS	Army Global Command Control System
AMSA	Area maintenance support activities
AR	Army Regulation OR Army Reserve
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
AT/FP	Antiterrorism/Force Protection
BMAR	Backlog of maintenance and repair
BMP	Best management practices
BOD	Beneficial occupancy date
CAD	Computer-aided design
CATV	Cable access television
CCTV	Closed circuit television
CCL	Construction cost limit
CE-R	Corps of Engineers Regulation
CFCI	Contractor-furnished/contractor-installed
CFR	Code of Federal Regulations
CMU	Concrete Masonry Unit
COE	Corps of Engineers
COMSEC	Communications Security
CT	Current transformer
CWE	Current working estimate
DAAR-EN	Department of the Army, Army Reserve – Engineering
Design Agency	Corps of Engineers and supporting architectural/engineering firms
DIA	Defense Intelligence Agency
D/B	Design/build
D/B/B	Design/bid/build
DCID	Director of Central Intelligence Directive
DDC	Direct digital controls
DDG	District design guide
DEPMED	Deployable medical
DOD	Department of Defense
DOT	Department of Transportation

A.1 continued

DPW	Department of Public Works
DRC	Direct Reporting Command
DS/GS	Direct support and general support (maintenance shop)
EA	Environmental assessment
EBS	Environmental baseline survey
ECS	Equipment concentration site
EFS	Engineering Feasibility Study
EPA	Environmental Protection Agency
ETL	Engineering technical letter
FEMA	Federal Emergency Management Agency
FFR	Full facility revitalization
FONSI	Finding of no significant impact
FPI	Federal Prison Industries
FPM	Feet per minute
GFCI	Government-furnished/contractor-installed
GFGI	Government-furnished/government-installed
GSA	Government Service Administration
HID	High intensity discharge (lighting)
HVAC	Heating, ventilating, and air conditioning
IDS	Intrusion detection system
IES	Illuminating Engineering Society
I-P	Inch-pound
IT	Information technology
LAN	Local area network
LCC	Life cycle cost
LCD	Liquid crystal display
LED	Light emitting diode
LP	Lump sum
LRL	Louisville District, Corps of Engineers
M&R	Maintenance and repair
M-CACES	Military Computer-Aided Cost Estimating System
MCAR	Military Construction Army Reserve
MDS	Modular Design System
MEP	Military equipment parking area
MILCON	Military Construction
MKT	Mobile Kitchen Trailer
MMCAR	Minor Military Construction Army Reserve
MOS	Military occupational specialty
NASA	National Aeronautics Space Administration
NAVFAC	U.S. Naval Facilities Engineering Command
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturing Association
NFPA	National Fire Protection Association
NOC	Network Operations Center

A.1 continued

NPDES	National Pollutant Discharge Elimination System
OCAR	Office of the Chief, Army Reserve
OCE	Office of the Corps of Engineers
OMAR	Operation and Maintenance Army Reserve
OMS	Organizational maintenance shops
OSHA	Occupational Safety and Health Administration
PA	Programmed amount OR Project architect OR Public address
PCC	Portland cement concrete
PF	Protection factor
PMO	Provost Marshal Office
POV	Privately-owned vehicles
PRV	Plant replacement value
PT	Physical training
REPR	Real Estate Planning Report
RFP	Request for proposal
RSC	Regional Support Command
RST	Reserve Support Team
SCIF	Secure compartmented intelligence facility
SF	Square foot
SGML	Standard Generalized Markup Language
SLDC	Single line digital control
SSMRS	Standing seam metal roof systems
SSO	SCIF Security Officer
STC	Sound transmission coefficient
TC	Training center
TI	Technical Instruction
TM	Technical manual
UBC	Uniform Building Code
UFGS	Unified Facility Guide Specifications
UFGS RST	UFGS - Reserve Support Team
UNICOR	Federal Prison Industry
USACE	U.S. Army Corps of Engineers
UFAS	Uniform Federal Accessibility Standards
USARC	United States Army Reserve Center
Using Service	Office of the Chief, Army Reserve
VAV	Variable air volume
VCT	Vinyl composition tile
WAN	Wide area network
WBS	Work breakdown structure

A.2 Military Rank Designations

A.2.1 Military rank is frequently referred to by pay-grade designations; such designations for officers are as follows:

O1	(oh one) Second Lieutenant
O2	First Lieutenant
O3	Captain
O4	Major
O5	Lieutenant Colonel
O6	Colonel
O7	Brigadier General (one-star)
O8	Major General (two-star)
O9	Lieutenant General (three-star)
O10	General (four-star)

A2.2 Enlisted and warrant officer pay-grade designations are similar to the officer designations, but begin with “E” or “W.”

Appendix B

OMAR-Funded Items

B.1

General

B.1.1 OMAR funding for furniture and collateral equipment associated with newly constructed AR training facilities must be identified well in advance of project execution for budgetary purposes. Physical fitness equipment has been added as a typically OMAR-funded item beginning in FY02 or as directed by the USAREng Project Officer. Physical fitness equipment will be funded at the same time as furniture, as Government-furnished/Government-installed (GFGI) equipment.

B.1.2 MCAR funding in general applies to items permanently attached to the structure which cannot be relocated to other facilities for easy reuse. Items that can be moved and reused with relative ease are considered collateral equipment and, as such, will be OMAR-funded. All OMAR-funded items must be identified as to when the actual obligations are to take place, either at award of construction contract or later, nearer the beneficial occupancy date (BOD). Regardless of when the funds are to be obligated, the funding must be identified to USAREng at least one full budget year in advance of obligations for USAREng's budgeting purposes.

B.2

OMAR-Funded Items

B.2.1 Kitchen Equipment

- Tray and silver dispenser
- Cup and glass dispenser
- Juice dispenser
- Silver soak pan
- Coffee urn
- Mobile hot food counter
- Warming cabinet
- Mixer
- Cold food unit
- Worktable, mobile
- Hot food unit
- Hot food well
- Refrigerator
- Freezer
- Worktable
- Can opener
- Slicer
- Mixer stand
- Utensil rack
- Mobile table

B.2 Continued

- Mixer
- Pot and pan cart

B.2.2 All furniture: prewired systems and freestanding (furniture will be GFGI and require separate design and pricing breakout by phase, if applicable, in all project submittals)

B.2.3 Physical fitness equipment (GFGI at same time as furniture)

B.2.4 Telephone handsets (conduit, cabling, and any central switch is MCAR-funded)

B.2.5 Arms vault dehumidifier

B.2.6 Freestanding metal lockers (built-in lockers, which are a part of the structure, will be MCAR- funded; screw attachment to floor or walls for stability is not considered to constitute built-in)

B.2.7 Freestanding metal storage cabinets and workbenches

B.2.8 Freestanding metal shelving, including that which is in caged storage areas

B.2.9 Unit storage, arms vault, tools and parts storage, or similar caging

Appendix C

Design Criteria And Guidance

C.1 There is extensive criteria and guidance which applies to AR projects. See Section 2.2 for a discussion of the applicability of such guidance. In cases of conflicting requirements, the more stringent generally apply, and Federal or military guidance generally takes precedence over other guidance. The Using Service is the final arbiter of which criteria should be applied.

C.2 The Scope of Work for a particular project may also include project-specific criteria and guidance.

C.3 The following lists are provided for designer information and reference, and are not exhaustive. Current editions should be used. Many of the military criteria can be found at www.hnd.usace.army.mil/techinfo/index.asp. Other websites where criteria and information may be found are: www.usapa.army.mil/gils/ (Army Regulations); bc.cecer.army.mil/mds/ (MDS information); www.ccb.org/ufgs/ufgs.htm (Unified Facility Guide Specifications and SpecsIntact); www.lrl.usace.army.mil/ed/specs/cegs/specs.htm (Army Reserve and Louisville District COE Guide Specifications and links to other sites); and www.fas.org/irp/offdocs/dcid.htm.

C.4 Codes and Other National or Industry Design Criteria and Guidance

- ACI 318 American Concrete Institute Building Code Requirements for Reinforced Concrete
- AISC Manual of Steel Construction
- ASCE 7-95 Minimum Design Loads for Buildings
- ASCE, Design and Construction of Sanitary and Storm Sewers
- ASME B 31.8 Gas Transmission and Distribution Piping Systems
- ASHRAE Guide and Data Book, current edition
- ASHRAE 15 Safety Code for Mechanical Refrigeration
- ASHRAE 62 Ventilation for Acceptable Indoor Air Quality
- ASHRAE 90 Energy Standard for Buildings
- EIA/TIA-568 Commercial Buildings Telecommunications Cabling Standard
- EIA/TIA-569 Commercial Buildings Standard for Telecommunication Pathways and Spaces
- EIA/TIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications

C.4 Continued

EPA-840-B-92-002, 1143, Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters
 Executive Order 13123 – Greening the Government through Energy Efficient Management
 Federal Specification AA-V-2737, Modular Vault Systems
 IES (Illuminating Engineering Society)
 National Bureau of Standards Handbook 135: Life Cycle Cost Manual for the Federal Energy Management Program
 National Electrical Code
 National Electrical Safety Code
 National Standard Plumbing Code
 NFPA 10 Standard for Portable Fire Extinguishers
 NFPA 13 Installation of Sprinkler Systems
 NFPA 54 National Fuel Gas Code
 NFPA 72 National Fire Alarm Code
 NFPA 78 Lightning Protection Code
 NFPA 88B Standard for Repair Garages
 NFPA 101 Life Safety Code
 SDI Steel Roof Deck Design Manual
 SJI Standard Specifications and Load Tables
 SMACNA Duct Standards
 Uniform Building Code (UBC)
 U.S. Department of Energy, The Modeling Commissioning Plan and Guide Specifications
 10 CFR Parts 434 and 435 Energy Code for New Federal Commercial and Multifamily High Rise Residential Buildings; Final Rule
 10 CFR Part 436 Subpart a Methodology and Procedures for Life Cycle Cost Analysis

C.5 AR/COE Criteria and Standards

Architect – Engineer Design Guide For Military Construction
 Architect And Engineering Instructions (AEI)
 AT/FP Guidance for USARC Construction, 20 September 2000
 Interim Department of Defense Antiterrorism/Force Protection Construction Standards, 16 December 1999
 (with 15 February 2000 errata)
 Progressive Design Collapse, 4 April 2000
 USAR Design Process and Submittal Requirements
 USAR CIO Information Technology Requirements for Military Construction Army Reserve, 22 July 1999

C.6**C.6 Engineer Technical Letters**

TL 1110-1-181 Procurement of Energy Efficient Liquid Chillers
TL 1110-3-446 Revision of Thrust Block Criteria in
TM5-813-5/AFM 88-10, vol. 5 Appendix C
TL 1110-3-465 Design and Construction of Water Meters
TL 1110-3-466 Selection and Design of Oil/Water Separators at
Army Facilities
TL 1110-3-472 Modular Vaults and Vault Doors
TL 1110-3-474 Cathodic Protection
TL 1110-3-481 Containment and Disposal of Aqueous Film-
Forming Foam Solution
TL 1110-3-484 Aircraft Hangar Fire Protection Systems
TL 1110-3-485 Fire Protection for Helicopter Hangars
TL 1110-3-491, Appendix B—Sustainable Design for Military
Facilities
TL 1110-3-502 Telephone and Network Distribution System
Design and Implementation Guide, 1 March 2000, with enclo-
sures

C.7 Manuals

Defense Intelligence Agency (DIA) Manual 50-3.

C.8 Engineer Pamphlets

EP 310-1-6 Graphic Standards Manual.

C.9 Technical Bulletins

TB 55-46-1 Standard Characteristics for Transportability of Military
Vehicles, available at www.tea.army.mil/si/tb55

C.10 Technical Manuals.

TM 5-683 Facilities Engineering: Electrical Interior Facilities
TM 5-785 Engineering Weather Data
TM 5-802-1 Economic Studies
TM 5-803-5 Installation Design.
TM 5-803-13 Landscape Design and Planting Guide
TM 5-803-14 Site Planning and Design
TM5-805-4 Noise and Vibration Control
TM 5-809-3 Masonry Structural Design for Buildings
TM 5-810-1 Mechanical Design Heating Ventilating and Air
Conditioning

C.10 Continued

TM 5-810-4 Compressed Air
 TM 5-810-5 Plumbing.
 TM 5-810-6 Non-Industrial Gas Piping Systems.
 TM 5-811-1 Electrical Power Supply and Distribution.
 TM 5-811-2 Interior Electrical System.
 TM 5-811-3 Electrical Design: Lightning and Static Electricity
 Protection
 TM 5-811-7 Electrical Design, Cathodic Protection
 TM 5-811-3/AFM 88-9 Chapter 3-Static Electricity Protection
 TM 5-811-3/AFM 88-9 Chapter 2-Lightning Protection
 TM 5-813-1 Water Supply, General Considerations
 TM 5-813-5 Water Supply, Water Distribution Systems
 TM 5-814-1 Sanitary and Industrial Wastewater Collection: Gravity
 Sewers and Appurtenances
 TM 5-814-2 Sanitary and Industrial Wastewater Collection: Pumping
 Stations and Force Mains
 TM 5-815-3 Heating Ventilating and Air Conditioning (HVAC)
 Control Systems
 TM 5-818-4 Backfill for Subsurface Structures
 TM 5-820-4 Drainage Areas other than Airfields
 TM 5-822-2 General Provisions and Geometric Design for Roads,
 Streets, Walks and Open Storage Areas
 TM 5-822-5 Pavement Design for Roads, Streets, Walks and
 Open Storage Areas
 TM 5-822-7 Standard Practice for Concrete Pavements
 TM 5-822-8 Bituminous Pavements: Standard Practice
 TM 5-822-13 Pavement Design for Roads, Streets and Open
 Storage Areas

C.11 Army Regulations

AR 140-483 Army Reserve Land and Facilities Management
 AR 190-11 Physical Security of Weapons, Ammunition &
 Explosives
 AR 190-16 Physical Security
 AR 190-51 Security of Unclassified Army Property
 AR 415-15 MCA Programs Development (Draft)
 AR 415-17 Empirical Cost Estimates.
 AR 420-10 Management of Installation Directorates of Public Works
 AR 420-54 Air Conditioning, Evaporating Cooling,
 Dehumidification and Mechanical Ventilation
 AR 420-90 Fire Protection

C.12**C.12 COE Engineering Regulations**

ER 25-1-90 Visual Information
ER 1110-345-100 Design Policy for Military Construction
ER 1110-345-122 Interior Design
ER 1110-345-700 Design Analyses

C.13 Military Handbooks

Military Handbook 1008C Fire Protection for Facilities
Engineering Design and Construction (MIL HDBK 1008C)

C.14 Technical Instructions

TI 800-01 Design Criteria
TI 800-01 Chapter 9 – Fire Protection Criteria
TI 800-01 Chapter 11 – Energy Conservation Criteria
TI 800-01 Chapter 13 – Air Conditioning, Dehumidification,
Evaporative Cooling, Heating, Mechanical Ventilation and
Refrigeration
TI 800-01 Chapter 15 – Plumbing Equipment Criteria
TI 800-04 Installation Support
TI 809-02 Structural Design Criteria for Buildings
TI 809-04 Seismic Design for Buildings
TI 809-05 Seismic Evaluation and Rehabilitation for Buildings
TI 809-07 Design of Cold-Formed Load bearing Steel Systems and
Masonry Veneer/Steel Stud Walls
TI 809-26 Welding - Design Procedures and Inspection
TI 809-28 Design and Construction of Conventionally Reinforced
Ribbed Mat Slabs
TI 809-29 Structural Considerations for Metal Roofing
TI 809-30 Metal Building Systems
TI 809-51 Seismic Review Procedures for Military Buildings
TI 809-52 Commentary on Snow Loads
TI 809-53 Commentary on Roofing Systems
TI 810-10 Mechanical Design of Heating, Ventilation and Air
Conditioning
TI 810-11 Heating, Ventilating and Air Conditioning (HVAC) Control
Systems
TI 810-90 Elevator Systems
TI 811-12 Utility Monitoring and Control Systems
TI 811-16 Lighting Design
TI 814-03 Water Distribution

C.15**C.15 Unified Facility Criteria**

UFC 1-300-02 Military Use of Model Building Codes
UFC 3-310-01 Load Assumptions for Buildings
UFC 4-101-01 DoD Minimum Antiterrorism Standards for Buildings,

C.16 Miscellaneous Criteria

DG 1110-3-122 Design Guide for U.S. Army Reserve Facilities
EM 1110-2-501 Small Wastewater Systems
NISTIR 85-3272-14r Energy Price Indices and Discount Factors
for LCCA (<http://fire.nist.gov/bfrlpubs/build01/art076.html>)
OMB Circular No. A-94, Appendix C Discount Rates for Cost
Effectiveness, Lease Purchase and Related Analyses
(www.whitehouse.gov/omb/circulars/a094)

Appendix D

Sample 1390, 1391, and 5034R - Functional Space Details

Sample 1390

1. COMPONENT USAR		FY 2006 GUARD AND RESERVE MILITARY CONSTRUCTION		2. DATE Jun 01	
3. INSTALLATION AND LOCATION PROPOSED USARC/OMS , CONWAY, AR				4. AREA CONSTR COST INDEX 0.87	
5. FREQUENCY AND TYPE UTILIZATION Reservists - 1 weekends/month 2 nights/week Full-Time Personnel - 5 days/week					
6. OTHER ACTIVE/GUARD/RESERVE INSTALLATIONS WITHIN 15 MILE RADIUS					
7. PROJECTS REQUESTED IN THIS PROGRAM					
CATEGORY CODE	PROJECT TITLE	SCOPE	COST (\$000)	DESIGN STATUS START COMPLETE	
17140	USAR Center/OMS/Unheat Strg	28,607 SF	5,265	N/A N/A	
8. STATE RESERVE FORCES FACILITIES BOARD RECOMMENDATION Facilities identified in Item 6 have been examined by the 05 Oct 2000 Joint Service Reserve Component Facility Board for possible (Date) joint use/expansion. The board recommends unilateral construction.					
9. LAND ACQUISITION REQUIRED FEE EXCHANGE				10.00 (Number of Acres)	
10. PROJECTS PLANNED IN NEXT FOUR YEARS		FISCAL YEAR	COST (\$000)		
None					

DD Form 1390S/1, MAY 78 120/215 Page 1 of 2 E -

D Sample 1390 **(continued)**

1. COMPONENT USAR	FY 2006 GUARD AND RESERVE MILITARY CONSTRUCTION	2. DATE Jun 01
3. INSTALLATION AND LOCATION PROPOSED USARC/OMS , CONWAY, AR		4. AREA CONSTR COST INDEX 0.87
11. PERSONNEL STRENGTH AS OF: 20 Apr 2001		
	PERMANENT <u>TOTAL</u> <u>OFFICER</u> <u>ENLISTED</u> <u>CIVILIAN</u>	GUARD/RESERVE <u>TOTAL</u> <u>OFFICER</u> <u>ENLISTED</u>
AUTHORIZE	6 0 4 2	107 5 102
ACTUAL	6 0 4 2	65 3 62
12. RESERVE UNIT DATA ASGD/AUTH 61%		
UNIT DESIGNATION	STRENGTH	
	AUTHORIZED	ACTUAL
489 EN BN CO B (CBT COR	107	65
Totals	107	65
13. MAJOR EQUIPMENT AND AIRCRAFT		
TYPE	AUTHORIZED	ACTUAL
Wheeled Vehicles	20	20
Trailers	23	23
Tracked Vehicles	19	19
Totals	62	62
14. OUTSTANDING POLLUTION AND SAFETY DEFICIENCIES		
	(\$000)	
Air Pollution	0	
Water Pollution	0	
Safety and Occupational Health	0	
DD Form 1390S/2, MAY 78 REPLACES DD Form 1390S, DEC 76, WHICH IS OBSOLETE Page 2 of 2 E -		

D Sample 1391

1. COMPONENT USAR		FY2002 MILITARY CONSTRUCTION PROJECT DATA			2. DATE Jun 01	
3. INSTALLATION AND LOCATION USAR Center/OMS Conway, AR			4. PROJECT TITLE USAR Center/OMS/Unheat Stru			
5. PROGRAM ELEMENT 55994A		6. CATEGORY CODE 17140	7. PROJECT NUMBER CAR 02-10317		8. PROJECT COST (\$000) 5,625	
9. COST ESTIMATES						
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)		
<u>PRIMARY FACILITIES:</u>				3796		
Training Building (22,617 SF)	m2	2,101	1099.00	(2309)		
Maintenance Building (5,454 SF)	m2	507	1163.71	(590)		
Unheated Storage (536 SF)	m2	50	720.00	(36)		
Land	m2	40,469	20.56	(832)		
Antiterrorism/Force Protection	LS	-	-	(29)		
<u>SUPPORTING FACILITIES:</u>				1272		
Site Improvement	LS	-	-	(680)		
Telecommunications	LS	-	-	(175)		
Parking Area (6,751 SY)	m2	5645	38.97	(220)		
Fencing (700 LF)	m	213	65.73	(14)		
Antiterrorism/Force Protection	LS	-	-	(8)		
Utilities	LS	-	-	(175)		
TOTAL CONSTRUCTION COST				5068		
Contingencies (5.0 %)				254		
Supervision and Administration (5.7 %)				303		
<u>TOTAL PROJECT COST</u>				<u>5625</u>		
10. DESCRIPTION OF PROPOSED CONSTRUCTION						
<p>Construct a 100-member U.S. Army Reserve Training Center (USARC), an Unheated Storage Building, and a two-workbay Area Maintenance Support Activity (AMSA)/Organizational Maintenance Shop (OMS). Buildings will be of permanent construction with reinforced concrete foundations, concrete floor slabs, structural steel frames, masonry veneer walls, standing seam metal roof, HVAC systems; plumbing, mechanical systems, security systems, and electrical systems. Supporting facilities include land clearing, paving, fencing, general site improvements, and extension of utilities to serve projects. Force protection (physical security) measures will be incorporated into design including maximum standoff distance from roads, parking areas, and vehicle unloading areas; berms, heavy landscaping, and bollards to prevent access when standoff distance cannot be maintained. AIR CONDITIONING: 211 kws (55 Tons)</p>						
11. REQUIREMENT: 2,658 m2 Adequate: 0 m2 Substandard: 0 m2						
<p>PROJECT: Construct a 100-member U.S. Army Reserve Training Center (USARC), an Unheated Storage Building, and a two-workbay Area Maintenance Support Activity (AMSA)/Organizational Maintenance Shop (OMS). (Current Mission)</p> <p>REQUIREMENT: This project will provide facilities necessary to conduct and support training of the reserve components by replacing the existing government-owned 1959 vintage facility located on leased land. This project includes construction of a 100-member training facility with administrative areas, classrooms, library, learning center, assembly hall,</p>						
DD FORM 1391 1 DEC 76				Page 1 of 3		

D Sample 1391 **(continued)**

1. COMPONENT USAR	FY 2002 MILITARY CONSTRUCTION PROJECT DATA		2. DATE Jun 01												
3. INSTALLATION AND LOCATION USAR Center/OMS Conway, AR															
4. PROJECT TITLE USAR Center/OMS/Unheat Strg		5. PROJECT NUMBER CAR 02-10317													
<p>11. REQUIREMENT (CONT)</p> <p>arms vault, and unit storage functions for one FSP Tier 1A Engineer Unit. The construction of the OMS shop consists of two workbays and maintenance administrative areas to support 3 fulltime mechanics and 1 maintenance administrative personnel. The project will also provide adequate parking space for all military and privately owned vehicles.</p> <p>CURRENT SITUATION: The Eldridge-Harrington USARC, constructed in 1959, consists of a government-owned 12,189 square feet training building, and a 3,050 square feet maintenance building located on a three acre nominal land lease from the Board of Trustees of the Arkansas State Teachers College, now the University of Central Arkansas, that expires in 2056. One Engineer Company and an AMSA Sub-Shop occupy the facility. The current utilization rate is 168% for the training building and 135% for the maintenance building. The site is completely enclosed by the University campus prohibiting future expansion.</p> <p>IMPACT IF NOT PROVIDED: The Engineer Company would continue to train in their current facilities. The operation of engineer equipment disrupts the surrounding University resulting in negative community impact. The overcrowded existing facilities do hamper in the training and readiness of the unit.</p> <p>ADDITIONAL: This project was coordinated with the 90th Regional Support Command physical security plan and no force protection/combating terrorism measures other than those required by regulations and design guides for protecting Federal property are included.</p> <p>JOINT USE CERTIFICATION: The Deputy Assistant Secretary of the Army (Installations and Housing) certifies that this project has been considered for joint use potential. This facility will be available for use by other components.</p>															
<p>12. SUPPLEMENTAL DATA:</p> <p>a. Estimated design data:</p> <p>(1) Status:</p> <table> <tr> <td>(a) Date Design Started.....</td> <td>/</td> </tr> <tr> <td>(b) Percent Complete as of</td> <td>%</td> </tr> <tr> <td>(c) Date Design 35% Complete.....</td> <td>/</td> </tr> <tr> <td>(d) Date Design Complete.....</td> <td>/</td> </tr> <tr> <td>(e) Parametric Cost Estimating Used to Develop Cost.</td> <td>No</td> </tr> <tr> <td>(f) An energy study and life cycle cost analysis will</td> <td></td> </tr> </table>				(a) Date Design Started.....	/	(b) Percent Complete as of	%	(c) Date Design 35% Complete.....	/	(d) Date Design Complete.....	/	(e) Parametric Cost Estimating Used to Develop Cost.	No	(f) An energy study and life cycle cost analysis will	
(a) Date Design Started.....	/														
(b) Percent Complete as of	%														
(c) Date Design 35% Complete.....	/														
(d) Date Design Complete.....	/														
(e) Parametric Cost Estimating Used to Develop Cost.	No														
(f) An energy study and life cycle cost analysis will															

DD FORM 1391c
1 DEC 78

Page 2 of 3

D Sample 1391 **(continued)**

1. COMPONENT USAR	FY 2002 MILITARY CONSTRUCTION PROJECT DATA	2. DATE Jun 01																																				
3. INSTALLATION AND LOCATION USAR Center/OMS Conwav, AR																																						
4. PROJECT TITLE USAR Center/OMS/Unheat Strg		5. PROJECT NUMBER CAR 02-10317																																				
<p>12. SUPPLEMENTAL DATA: (Continued)</p> <p style="padding-left: 40px;">be documented during the final design.</p> <p style="padding-left: 20px;">(g) Type of Design Contract.....</p> <p>(2) Basis:</p> <p style="padding-left: 20px;">(a) Standard or Definitive Design..... <u>No</u></p> <p style="padding-left: 20px;">(b) Where Design Was Most Recently Used... <u>N/A</u></p> <p>(3) Total Cost (c) = (a) + (b) or (d) + (e) : <u>(\$000)</u></p> <p style="padding-left: 20px;">(a) Production of Plans and Specifications..... <u>0</u></p> <p style="padding-left: 20px;">(b) All Other Design Costs..... <u>0</u></p> <p style="padding-left: 20px;">(c) Total..... <u>0</u></p> <p style="padding-left: 20px;">(d) Contract..... <u>0</u></p> <p style="padding-left: 20px;">(e) In-house..... <u>0</u></p> <p>(4) Construction Award..... <u>/</u></p> <p>(5) Construction Start..... <u>/</u></p> <p>(6) Construction Completion..... <u>/</u></p> <p>b. Equipment associated with this project which will be provided from other appropriations:</p> <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Equipment Nomenclature</th> <th style="text-align: left;">Procuring Appropriation</th> <th style="text-align: left;">Fiscal Year Appropriated Or Requested</th> <th style="text-align: right;">Cost (\$000)</th> </tr> </thead> <tbody> <tr> <td>Furniture</td> <td>OMAR</td> <td>2003</td> <td style="text-align: right;">188</td> </tr> <tr> <td>Shelving</td> <td>OMAR</td> <td>2002</td> <td style="text-align: right;">111</td> </tr> <tr> <td>Fitness Equipment</td> <td>OMAR</td> <td>2003</td> <td style="text-align: right;">50</td> </tr> <tr> <td>Wire Partitions</td> <td>OMAR</td> <td>2002</td> <td style="text-align: right;">128</td> </tr> <tr> <td>Dehumidifier</td> <td>OMAR</td> <td>2003</td> <td style="text-align: right;">1</td> </tr> <tr> <td>IT SPT Equipment</td> <td>OMAR</td> <td>2003</td> <td style="text-align: right;">157</td> </tr> <tr> <td>Lockers</td> <td>OMAR</td> <td>2002</td> <td style="text-align: right;">50</td> </tr> <tr> <td colspan="3" style="text-align: right;">TOTAL:</td> <td style="text-align: right; border-top: 1px solid black;">685</td> </tr> </tbody> </table> <p style="text-align: right; margin-top: 20px;">Point of Contact: Mr. Flemming, 703-601-3419</p>			Equipment Nomenclature	Procuring Appropriation	Fiscal Year Appropriated Or Requested	Cost (\$000)	Furniture	OMAR	2003	188	Shelving	OMAR	2002	111	Fitness Equipment	OMAR	2003	50	Wire Partitions	OMAR	2002	128	Dehumidifier	OMAR	2003	1	IT SPT Equipment	OMAR	2003	157	Lockers	OMAR	2002	50	TOTAL:			685
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Lockers	OMAR	2002	50																																			
TOTAL:			685																																			

DD FORM 1391c
1 DEC 76

Page 3 of 3

D Sample 5034-R

Project Number : 10317
 Project Title : USAR Center/OMS/Unheat Str
 Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

	Authorized	Approved	Existing	Memo
I. Training Building				
A. Administrative Areas	2971.0	3131.0	0.0	
(1) Full Time	360.0	360.0		1A1
(2) Unit Exclusive	270.0	270.0		1A2
(3) Unit Common	1311.0	1311.0		1A3
(4) Retention	250.0	250.0		1A4
(5) Admin. Support	300.0	460.0		
(a) General	180.0	180.0		1A5a
(b) RCAS	120.0	280.0		1A5b
(6) Lobby Area	480.0	480.0		1A6
B. Assembly Area	3300.0	3300.0	0.0	
(1) Assembly Areas	3000.0	3000.0		1B1
(2) Chair and Table Storage	300.0	300.0		1B2
C. Kitchens - Std. Design	0.0	0.0	0.0	1C
D. Weapons Area	540.0	540.0	0.0	
(1) Vault	440.0	440.0		1D1
(2) Armorer	100.0	100.0		1D2
E. Educational Areas	1730.0	1730.0	0.0	
(1) Classrooms	900.0	900.0		1E1
(2) Library Reading Room	300.0	300.0		1E2
(3) Library Storage	90.0	90.0		1E3
(4) Learning Center	150.0	150.0		1E4
(5) Training Aids Storage	90.0	90.0		1E5
(6) COMSEC Training	100.0	100.0		1E6
(7) COMSEC Storage	100.0	100.0		1E7
(8) USARF Instructor Classroom	0.0	0.0		1E8
(9) USARF Publication Storage	0.0	0.0		1E9
F. Storage Areas	3157.0	3157.0	0.0	
(1) Unit/Individual Equipment	1988.0	1988.0		1F1
(2) Staging Area	199.0	199.0		1F2
(3) Supply Office	120.0	120.0		1F3
(4) Janitorial Storage	50.0	50.0		1F4
(5) Flammable Storage	0.0	0.0		1F5
(6) Controlled Waste Storage	0.0	0.0		1F6
(7) Facility Maintenance	800.0	800.0		1F7
G. Special Training Areas	1100.0	2525.0	0.0	
(1) Rifle Range	0.0	0.0		1G1
(2) Photo Lab	0.0	0.0		1G2
(3) Band Room	0.0	0.0		1G3
(4) Medical Section Area	0.0	0.0		1G4
(5) Physical Exam Wing	0.0	0.0		1G5
(6) SCIF	0.0	0.0		1G6

D Sample 5034-R **(continued)**

Project Number	: 10317			
Project Title	: USAR Center/OMS/Unheat Str			
Date	: 24 Oct 2001			
Functional Space Details - ACTUAL/ENGLISH				
Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings				
	Authorized	Approved	Existing	Memo
(7) Soils Testing Lab	0.0	0.0		1G7
(8) G.O. Conference Room	0.0	0.0		1G8
(9) Drafting Room	0.0	0.0		1G9
(10) Physical Readiness Area	1100.0	1100.0		1G10
(11) AGCCS	0.0	0.0		1G11
(12) Family Support	0.0	200.0		1G12
(13) Weapons Simulat	0.0	1225.0		1G13
(14)	0.0	0.0		1G14
(15)	0.0	0.0		1G15
H. Support Area	3568.0	3710.0	0.0	
(1) Men's Toilets and Showers	350.0	350.0		1H1
(2) Women's Toilets and Showers	225.0	225.0		1H2
(3) Unisex Handicap Toilet	75.0	75.0		1H3
(4) Locker Room	1100.0	1100.0		1H4
(5) Vending Alcove	48.0	48.0		1H5
(6) Break Area	218.0	218.0		1H6
(7) Mechanical/Custodial	1352.0	1494.0		1H7
(8) Electrical	100.0	100.0		1H8
(9) Telephone	100.0	100.0		1H9
Total Center Net Training Area	16366.0	18093.0		
Circulation Allowance (15% or 22%)	2454.9	2714.0		Circ - Trng
Structural Allowance (10% of Net)	1636.6	1810.0		Struc - Trn
Total Center Gross Area	20457.5	22617.0	0.0	
Outgranted Area			0.0	
Total Center Available Gross Area			0.0	
II. Supporting Facilities				
A. Privately Owned Vehicle (POV)				
Parking - Center (SY)	3010.0	3010.0		2A1
B. Access Roads (SY)	301.0	301.0		2B
C. Flaggpole	0.0	1.0		2C
III. Total Square Footage for:				
	<u>Center</u>			
A. Authorized Size	20457.5			
B. Approved Size	22617.0			
C. Existing Size of Alteration	0.0			
D. Size of Addition	0.0			
E. Size of New Building	22617.0			
IV. Center Statistics:				
	<u>Total Personnel</u>	<u>Weekend</u>		
A. Rated Capacity	100			
B. Largest Drill Weekend	107	1		
C. Largest Admin Weekend	19	1		
D. Largest Maintenance Weekend	7	1		
E. Weekends Per Month	1			

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

1A1 -

ADMINISTRATIVE AREA, FULL TIME:

WRKCB0 is authorized three full time personnel with administrative duties.

3 FTS x 11.14 SM (360 SF) = 33.4 SM (360 SF)

1A2 -

ADMINISTRATIVE AREA, UNIT EXCLUSIVE:

WRKCB0: 1 CDR<06 x 13.9 SM (150 SF) = 13.9 SM (150 SF)

1 1SG x 11.14 SM (120 SF) = 11.14 SM (120 SF)

TOTAL = 25.1 SM (270 SF)

1A3 -

ADMINISTRATIVE AREA, UNIT COMMON:

Unit requires 19 unit common spaces.

19 Unit Common x 5.57 SM (60 SF) x 1.15 (Circulation) = 121.8 SM (1,311 SF)

1A4 -

ADMINISTRATIVE AREA, RETENTION:

Normal authorization is 23.2 SM (250 SF). Retention Office should be located near the main entrance to the facility.

1A5a -

ADMIN SUPPORT, GENERAL:

ALLOWANCE IS BASED ON THE TOTAL AUTHORIZED DRILLING STRENGTH OF THE LARGEST DRILL WEEKEND. SIXTY SQUARE FEET IS AUTHORIZED FOR EACH INCREMENT OR PORTION THEREOF OF 50 MEMBERS. SPACE IS PROVIDED FOR COPIER, FAX, AND MAIL OPERATIONS. SHOULD BE LOCATED NEAR ADMINISTRATIVE AREAS.

LARGEST DRILL WEEKEND HAS 107 SOLDIERS.

109 SOLDIERS/50 = 2.18=> 3 x 5.57 SM (60 SF) = 16.7 SM (180 SF)

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

1A5b -

ADMIN SUPPORT, RCAS:

References:

- a. Memorandum, HQ USARC, AFRC-CIS-I, 22 July 1999, Subject: Information Technology (IT) Requirements for Military Construction Army Reserve.
- b. Memorandum, OCAR, DAAR-EN, 27 October 1999, Subject: Information Technology Requirements in Design and Construction.

IT services provided on-site will include:
Voice Communications (Telephone)
Logistics, and other, STAMIS Applications

Within the 1-4 FTUS site, all IT support equipment will be rack-mounted in climate controlled facilities as IT Support Facilities. Recommended square footage for 1-4 FTUS IT Support Facilities are:

Network Operations Center (NOC)	14.9 SM (160 SF)
Electrical Closet	11.1 SM (120 SF)
TOTAL	26.0 SM (280 SF)

The Electrical Closet here is in addition to the normal authorization in Section H.(8).

Design and construction should comply with Reference a.

1A6 -

LOBBY AREA::

Normal authorization is 44.6 SM (480 SF).

1B1 -

ASSEMBLY AREA: PROVIDES SPACE FOR TROOP FORMATIONS, PERSONNEL ASSEMBLIES, FOOD SERVICE AND LARGE GROUP ASSEMBLIES FOR INSTRUCTIONAL TRAINING.

LOCATE ADJACENT TO THE UNIT SUPPLY, CHAIR AND TABLE STORAGE, AND CLASSROOM AREAS.

PROVIDE 10' MINIMUM CEILING HEIGHT IN THE ASSEMBLY AREA TO SUPPORT CLASSROOM TYPE TRAINING AND ASSEMBLY/DINING REQUIREMENTS OF THE UNITS ASSIGNED TO THE CENTER. THE ASSEMBLY AREA MAY HAVE A MOVEABLE PARTITION TO SUBDIVIDE THE ROOM INTO EQUALLY SIZED ASSEMBLY AREAS.

1B2 -

CHAIR & TABLE STORAGE: LOCATE ADJACENT TO THE ASSEMBLY AREA.

1C -

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

1D1 -

VAULT: VAULT SHOULD BE PROVIDED WITH ELECTRICAL AND PLUMBING FOR A DEHUMIDIFIER. LOCATE ADJACENT TO THE STAGING AREA WITH ENTRANCE TO THE VAULT THROUGH THE ARMORER AREA.

1D2 -

ARMORER: SHOULD BE PROVIDED WITH ENTRANCE TO VAULT THROUGH THIS 9.3 SM (100 SF) AREA AND ADJACENT TO STAGING AREA.

1E1 -

EDUCATIONAL AREAS, CLASSROOMS:

CLASSROOMS ARE AUTHORIZED BASED ON THE TOTAL AUTHORIZED DRILLING STRENGTH OF THE LARGEST DRILL WEEKEND.

109 SOLDIERS/50 = 2.18 -> 3.0 X 27.9 SM (300 SF) = 83.7 SM (900 SF) IS AUTHORIZED FOR CLASSROOMS.

PROVIDE ONE 83.7 SM (900 SF) CLASSROOM WITH MOVEABLE PARTITION TO SUBDIVIDE THE CLASSROOM INTO THREE 300 SF CLASSROOMS FOR SMALLER GROUPS. PROVIDE HALLWAY ACCESS TO ALL CLASSROOMS. LOCATE THE CLASSROOMS NEAR AN OUTSIDE ENTRANCE FOR EASY ACCESS WITHOUT GOING THROUGH THE ADMINISTRATIVE AREA.

1E2 -

EDUCATIONAL AREAS, LIBRARY READING ROOM:

ALLOWANCE IS BASED ON THE TOTAL AUTHORIZED DRILLING STRENGTH OF THE LARGEST DRILL WEEKEND.

THE MINIMUM AUTHORIZED SPACE IS 27.9 SM (300 SF).

THE LIBRARY READING ROOM SHALL BE DESIGNED TO ACCOMMODATE READING/STUDY OR CLASSROOM/CONFERENCE ACTIVITIES. LAYOUT OF THE LIBRARY READING ROOM, LEARNING CENTER, AND LIBRARY STORAGE/REFERENCE ROOM SHALL BE SIMILAR TO THAT SHOWN ON PAGE 35 OF THE DESIGN GUIDE FOR U.S. ARMY RESERVE FACILITIES. LOCATE ADJACENT TO THE LIBRARY STORAGE, LEARNING CENTER, AND TRAINING AID STORAGE AREAS.

1E3 -

EDUCATIONAL AREAS, LIBRARY STORAGE:

ALLOWANCE IS 10% OF TOTAL CLASSROOM SPACE.

83.6 SM (900 SF) X 10% = 8.4 SM (90 SF)

PROVIDE SHELVING TO STORE BOOKS, MANUALS, VIDEO TAPES, AND EIGHT-INCH TECH TAPES IN THE LIBRARY STORAGE ROOM. LOCATE ADJACENT TO THE LEARNING CENTER, LIBRARY READING ROOM, AND TRAINING AID STORAGE AREAS.

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

1E4 -

EDUCATIONAL AREAS, LEARNING CENTER:

ALLOWANCE IS BASED ON THE TOTAL AUTHORIZED DRILLING STRENGTH OF THE LARGEST DRILL WEEKEND.

$109 \text{ SOLDIERS}/50 = 2.18 \Rightarrow 3 \times 4.64 \text{ SM (50 SF)} = 13.9 \text{ SM (150 SF)}$

PROVIDE DUPLEX ELECTRICAL OUTLETS AT FOUR FOOT INTERVALS ALONG THE WALLS FOR OPERATION OF CARRELS WITH COMPUTER CONNECTIONS IN THE LEARNING CENTER. USE ONLY SINGLE, NOT DOUBLE, CARRELS IN THE FURNITURE DESIGN. LOCATE NEAR THE LIBRARY READING ROOM, LIBRARY STORAGE, AND TRAINING AID STORAGE AREAS.

1E5 -

EDUCATIONAL AREAS, TRAINING AIDS STORAGE:

ALLOWANCE IS 10% OF TOTAL CLASSROOM SPACE.

$83.6 \text{ SM (900 SF)} \times 10\% = 8.4 \text{ SM (90 SF)}$

PROVIDE SHELVING IN THE TRAINING AIDS STORAGE ROOM. LOCATE ADJACENT TO THE CLASSROOMS.

1E6 -

COMSEC TRAINING: PROVIDE ONE 9.3 SM (100 SF) AREAS LOCATED ADJACENT TO THE COMSEC STORAGE FOR THE UNIT AUTHORIZED.

1E7 -

COMSEC STORAGE: PROVIDE ONE 9.3 SM (100 SF) AREAS LOCATED ADJACENT TO THE COMSEC STORAGE FOR THE UNIT AUTHORIZED.

1E8 -

1E9 -

1F1 -

UNIT/INDIVIDUAL EQUIPMENT STORAGE:

SUBDIVIDE INTO 2.4-METER BY 3.7-METER (8-FOOT BY 12-FOOT) CAGES CONSTRUCTED OF WOVEN WELDED WIRE FABRIC. CAGING SHOULD BE INSTALLED FROM FLOOR TO THE ROOF DECK OR FLOOR SLAB ABOVE. AISLES AND VESTIBULES BETWEEN THE CAGED AREAS SHOULD BE KEPT TO A MINIMUM.

$18 \text{ CAGES @ } 8.92 \text{ SM (96 SF)} = 161 \text{ SM (1728 SF)}$

$\text{CIRCULATION @ } 15\% = 24 \text{ SM (260 SF)}$

$\text{TOTAL} = 185 \text{ SM (1988 SF)}$

1F2 -

STAGING AREA: Area will be 10% of the total individual storage area authorized. Staging area should have an exterior double door and adjacent to the supply office.

D Sample 5034-R
(continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH**Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings****1F3 -****SUPPLY OFFICE:**

One office of 11.15 SM (120 SF) is authorized for the fulltime supply person. The office should be located adjacent to the staging area and unit supply storage area.

1F4 -**STORAGE AREAS, JANITORIAL STORAGE:**

AUTHORIZED ALLOWANCE IS 4.6 SM (50 SF) FOR STORAGE OF JANITORIAL SUPPLIES AND EQUIPMENT.

1F5 -**1F6 -****1F7 -****STORAGE AREAS, FACILITY MAINTENANCE:**

THE AUTHORIZED SIZE FOR THE FACILITY MAINTENANCE AREA IS 74.3 SM (800 SF).

1G1 -**1G2 -****1G3 -****1G4 -****1G5 -****1G6 -****1G7 -****1G8 -****1G9 -**

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

1G10 -

SPECIAL TRAINING AREAS, PHYSICAL READINESS AREA:

ALLOWANCE IS BASED ON THE TOTAL AUTHORIZED DRILLING STRENGTH OF THE LARGEST DRILL WEEKEND.

$107 \text{ SOLDIERS}/10 = 10.7 \Rightarrow 11 \times 9.29 \text{ SM (100 SF)} = 102.2 \text{ SM (1100 SF)}$

A NEW PHYSICAL READINESS AREA NEAR THE NEW LOCKER ROOM SHOULD BE CONSTRUCTED. THE EXISTING PHYSICAL READINESS AREA CANNOT BE EXPANDED DUE TO BUILDING CONFIGURATION AND SHOULD BE REMODELED AS THE BREAK ROOM AFTER CONSTRUCTION OF THE ADDITION.

1G11 -

1G12 -

Special Training Areas, Family Support:

References:

a. Memorandum, USARC, DAAR-EN, 14 September 2000, Subject: Interim Change, AR 140-483, Army Reserve Land and Facilities Management

A family support office of 200 square feet (18.58 square meters) is authorized for all centers for use of all units on their respective drill weekends, regardless of unit strength.

1G13 -

Special Training Areas, Weapons Simulator Room:

A weapons simulator room is authorized based on the Engagement Skills Trainer (EST) Main Simulation Unit (MSU) configuration issued to a facility. The EST 5-lane Trainer is authorized area of 113.8 square meters (1225 square feet).

1G14 -

1G15 -

1H1 -

SUPPORT AREA, MEN'S TOILETS AND SHOWERS:

ALLOWANCE IS BASED ON 90% OF THE NUMBER OF PERSONNEL IN ATTENDANCE DURING THE LARGEST DRILL WEEKEND.

$16 \text{ SOLDIERS} \times 90\% = 15 \text{ MEMBERS}$

FIRST INCREMENT OF 100 = 32.5 SM (360 SF)

TOTAL SPACE AUTHORIZED FOR MEN'S TOILETS AND SHOWERS = 32.5 SM (350 SF)

THE TOILET AND SHOWER WILL BE DESIGNED AND CONSTRUCTED HANDICAP ACCESSIBLE.

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings

1H2 -

SUPPORT AREA, WOMEN'S TOILETS AND SHOWERS:

ALLOWANCE IS BASED ON 30% OF THE NUMBER OF PERSONNEL IN ATTENDANCE DURING THE LARGEST DRILL WEEKEND.

16 SOLDIERS X 30% = 5 MEMBERS

FIRST INCREMENT OF 100 = 20.9 SM (225 SF)

TOTAL AUTHORIZED FOR THE WOMEN'S TOILET AND SHOWERS = 20.9 SM (225 SF)

THE TOILET AND SHOWER WILL BE DESIGNED AND CONSTRUCTED HANDICAP ACCESSIBLE.

1H3 -

SUPPORT AREA, UNISEX HANDICAP TOILET:

The Men's and Women's Toilets will be designed and constructed handicap accessible.

1H4 -

SUPPORT AREA, LOCKER ROOM:

PROVIDE LOCKER ROOM FOR THE RESERVE UNITS. THE LOCKER ROOM SHOULD BE LOCATED ADJACENT TO THE LATRINE FACILITIES.

ALLOWANCE IS BASED ON THE TOTAL AUTHORIZED DRILLING STRENGTH OF THE LARGEST DRILL WEEKEND.

107 SOLDIERS/10 = 10.7 ⇒ 11 X 9.29 SM (100 SF) = 102.2 SM (1100 SF)

1H5 -

1H6 -

SUPPORT AREA, BREAK ROOM:

AUTHORIZED A 20.3 SM (218 SF) BREAK KITCHEN FOR THE FULL TIME STAFF

1H7 -

SUPPORT AREA, MECHANICAL:

ALLOWANCE IS 9% OF TOTAL APPROVED ALLOWANCES FOR A THROUGH H EXCLUDING H.(7).

AUTHORIZED SPACE IS NOMINAL. PROVIDE MECHANICAL ROOM SPACE AS REQUIRED BY THE EQUIPMENT USED TO HEAT AND COOL THE BUILDING ALONG WITH OTHER NEEDED OR REQUIRED EQUIPMENT.

1H8 -

SUPPORT AREA, ELECTRICAL:

AUTHORIZED SPACE IS NOMINAL. PROVIDE SPACE REQUIRED TO ACCOMMODATE NECESSARY EQUIPMENT.

D Sample 5034-R
(continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH**Type 1: USARC, AFRC, RTS, BPC, NCO Academy and Adjacent Buildings**

1H9 -

SUPPORT AREA, TELEPHONE:

AUTHORIZED SPACE IS NOMINAL. PROVIDE SPACE REQUIRED TO ACCOMMODATE THE
TELEPHONE EQUIPMENT. PROVIDE CLIMATE CONTROL (AC AND HEAT).

Circ - Trng -

Struc - Trng -

2A1 -

2B -

2C -

D Sample 5034-R
(continued)

Project Number : 10317

Project Title : USAR Center/OMS/Unheat Strg

Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH
Type 6: OMS/AMSA Collocated Shop Main and Adjacent Buildings

	Authorized	Approved	Existing	Memo
I. Maintenance Shops				
A. Organizational Maintenance Shop (OMS)	796.0	991.0	0	
(1) Shop Office	120.0	120.0		IA1
(2) Unisex Toilet	0.0	75.0		IA2
(3) Tool and Parts Storage	192.0	192.0		IA3
(4) Storage Room	192.0	192.0		IA4
(5) Battery Room	50.0	50.0		IA5
(6) Flammable Storage	50.0	50.0		IA6
(7) Controlled Waste Storage	192.0	192.0		IA7
(8) REF MANUAL STOR	0	120.0		IA8
(9)	0	0.0		IA9
B. Area Maintenance Support Activity (AMSA), Ground	0.0	966.0	0	
(1) Shop Office	0.0	240.0		IB1
(2) Men's Toilet	0.0	0.0		IB2
(3) Women's Toilet	0.0	0.0		IB3
(4) Locker Room	0.0	100.0		IB4
(5) Class Room/Break Area	0.0	0.0		IB5
(6) Tool Room	0.0	192.0		IB6
(7) Supply Room	0.0	192.0		IB7
(8) Battery Room	0.0	0.0		IB8
(9) Commo/Electrical Shop	0.0	0.0		IB9
(10) Instrument Repair	0.0	0.0		IB10
(11) Small Arms Repair	0.0	0.0		IB11
(12) Small Arms Vault	0.0	0.0		IB12
(13) Flammable Storage	0.0	50.0		IB13
(14) Controlled Waste Storage	0.0	192.0		IB13
(15)	0	0.0		IB13
(16)	0	0.0		IB13
C. Joint Maintenance Areas (OMS/AMSA)	2423.0	3001.0	0.0	
(1) Work Bays	2240.0	2240.0		1C1
(2) Mechanical/Custodial	183.0	281.0		1C2
(3) IT CLOSET	0	280.0		1C3
(4) Equipment Aclov	0	200.0		1C4
Total Shop Net Area	3219.0	4958.0		
Structural Allowance (10% of Net)	321.9	496.0		Struc -
Total Shop Gross Area	3540.9	5454.0	0	
Outgranted Area			0	
Total Shop Available Gross Area			0	

D Sample 5034-R **(continued)**

Project Number : 10317
Project Title : USAR Center/OMS/Unheat Strg
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH **Type 6: OMS/AMSA Collocated Shop Main and Adjacent Buildings**

	Authorized	Approved	Existing	Memo
II. Supporting Facilities				
A. Privately Owned Vehicle (POV)				
Parking - AMSA (SY)	3010.0	3010.0		IIA1
B. Military Equipment Park (MEP)	3100.0	3440.0		
(1) OMS (SY)	3100.0	3100.0		IIB1
(2) AMSA (SY)	0.0	340.0		IIB2
C. Wash Platforms				
OMS/AMSA (EA)	1	1		IIC1
D. MEP Fencing (LF)	672.0	672.0		IID
E. MEP Lighting (EA)	3	3		IIE
F. Access Roads (SY)	301.0	301.0		IIF
III. Total Square Footage for:				
	<u>Shop</u>			
A. Authorized Size	3540.9			
B. Approved Size	5454.0			
C. Existing Size of Alteration	0.0			
D. Size of Addition	0.0			
E. Size of New Building	5454.0			
IV. Center Statistics:				
	<u>Total Personnel</u>	<u>Weekend</u>		
A. Rated Capacity	100			
B. Largest Drill Weekend	107	1		
C. Largest Admin Weekend	19	1		
D. Largest Maintenance Weekend	7	1		
E. Weekends per Month	1			

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH Type 6: OMS/AMSA Collocated Shop Main and Adjacent Buildings

IA1 -

OMS, SHOP OFFICE: LOCATE SHOP OFFICE TO PROVIDE MAXIMUM VISIBILITY OF WORK BAYS. ACCESS SHOULD BE PROVIDED FROM THE SHOP OFFICE INTO THE WORK BAYS AND EXTERIOR OF THE BUILDING.

5.6 SM (60 SF) PER AUTHORIZED OMS ADMINISTRATIVE PERSON WHO WORKS IN THE OMS ON THE LARGEST MAINTENANCE DRILL WEEKEND, PLUS 11.1 SM (120 SF) PER FULL-TIME OMS MAINTENANCE ADMINISTRATIVE PERSON.

1 FULLTIME X 11.1 SM (120 SF) = 11.1 SM (120 SF)

IA2 -

IA3 -

OMS, TOOL AND PARTS STORAGE: SUBDIVIDE AREA INTO 2 EQUAL SECTIONS WITH WIRE/EXPANDED METAL STORAGE CAGES 2.4-METER BY 3.7-METER (8 FT X 12 FT) WITH SLIDING DOORS FOR TOOL AND PARTS STORAGE. CAGES MUST EXTEND TO WITHIN ONE INCH OF THE FLOOR AND CEILING. THIS SPACE SHOULD BE ADJACENT TO THE STORAGE ROOM AND DIRECTLY ACCESSABLE TO THE WORKBAYS.

IA4 -

OMS, STORAGE ROOM: SUBDIVIDE AREA INTO 2 SECTIONS WITH WIRE/EXPANDED METAL STORAGE CAGES 2.4-METER BY 3.7-METER (8 FT X 12 FT) WITH SLIDING DOORS FOR STORAGE. CAGES MUST EXTEND TO WITHIN ONE INCH OF THE FLOOR AND CEILING. THIS SPACE SHOULD BE ADJACENT TO THE TOOL AND PARTS ROOM AND DIRECTLY ACCESSABLE TO THE WORKBAYS. AREA TO BE USED FOR STORAGE OF ANCILLARY EQUIPMENT ISSUED WITH VEHICLES. A MINIMUM OF TWO DUPLEX 110V OUTLETS SHALL BE PROVIDED PER MODULE.

IA5 -

OMS, BATTERY ROOM: PROVIDE A BATTERY STORAGE ROOM COMPLYING WITH OSHA STANDARDS AND EPA STANDARDS AS OF THE DATE OF CONSTRUCTION. THE BATTERY ROOM LAYOUT SHALL INCORPORATE DESIGN FEATURES IDENTIFIED ON PAGES 67-68 OF THE DESIGN GUIDE FOR RESERVE FACILITIES. EYE WASH MUST BE INSTALLED IMMEDIATELY OUTSIDE OF THIS ROOM. ADJACENT VENTILLATION MUST BE INSTALLED.

IA6 -

OMS, FLAMMABLE STORAGE : MUST COMPLY WITH DESIGN GUIDE STANDARDS AND EPA STANDARDS AS OF DATE OF CONSTRUCTION. DOORS MUST OPEN TO THE OUTSIDE OF THE BUILDING.

IA7 -

IA8 -

REF MANUAL STORAGE/DISPATCH OFFICE:

DUE TO THE SIZE AND TYPE OF UNIT AND EQUIPMENT SERVICED OUT OF THIS OMS, A STORAGE AREA FOR REFERENCE MANUALS AND DISPATCH OFFICE IS DESIRABLE. THIS AREA SHOULD BE INCORPORATED AS PART OF THE OMS SHOP OFFICE.

APPROVED SIZE = 11.1 SM (120 SF)

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH Type 6: OMS/AMSA Collocated Shop Main and Adjacent Buildings

IA9 -

IB1 -

AMSA, SHOP OFFICE: LOCATE SHOP OFFICE TO PROVIDE MAXIMUM VISIBILITY OF WORK BAYS. ACCESS SHOULD BE PROVIDED FROM THE SHOP OFFICE INTO THE WORK BAYS AND EXTERIOR OF THE BUILDING.

A subshop of AMSA 95 is located in Conway. The subshop consists of two mechanics with administrative duties. Approve one 22.3 SM (240 SF) Shop Office.

IB2 -

IB3 -

IB4 -

AMSA LOCKER ROOM: 0.93 SM (10 SF) PER RECOGNIZED AMSA PERSON. LOCKER ROOM FOR FEMALE PERSONNEL WILL BE INCORPORATED INTO THE WOMEN'S TOILET. MINIMUM AREA WILL BE 9.3 SM (100 SF). Provide wall hung, full size, solid metal lockers, 15 inches wide by 18 inches deep by 72 inches high. Incorporate as part of the OMS Unisex toilet.

LOCKER ROOM AREA = 2 PERSONS X 0.93 SM (10 SF) = 1.86 SM (20 SF) => 9.3 SM (100 SF)

IB5 -

AMSA, CLASS ROOM/BREAK AREA: SHARE FACILITIES IN THE MAIN USARC.

IB6 -

AMSA, TOOL ROOM: Locate adjacent to the supply room with direct accessibility to the work bays. Divide the space into 2 separate caged areas with sliding cage doors.

WIRE/EXPANDED METAL STORAGE CAGES 2.4-METER BY 3.7-METER (8 FT X 12 FT) WITH SLIDING DOORS FOR TOOL AND PARTS STORAGE. CAGES MUST EXTEND TO WITHIN ONE INCH OF THE FLOOR AND CEILING.

2 Work Bays x 8.9 SM (96 SF) = 17.8 SM (192 SF).

IB7 -

AMSA, SUPPLY ROOM: Centrally locate to provide ease of access from the work bays. Provide metal shelving for storage of parts inside of caged areas in the supply room.

SUBDIVIDE AREA INTO 2 SECTIONS. WIRE/EXPANDED METAL STORAGE CAGES 2.4-METER BY 3.7-METER (8 FT X 12 FT) WITH SLIDING DOORS FOR STORAGE. CAGES MUST EXTEND TO WITHIN ONE INCH OF THE FLOOR AND CEILING. THIS SPACE SHOULD BE ADJACENT TO THE TOOL AND PARTS ROOM AND DIRECTLY ACCESSABLE TO THE WORKBAYS. A MINIMUM OF TWO DUPLEX 110V OUTLETS SHALL BE PROVIDED PER MODULE.

2 Work Bays x 8.9 SM (96 SF) = 17.8 SM (192 SF).

IB8 -

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH Type 6: OMS/AMSA Collocated Shop Main and Adjacent Buildings

IB9 -

IB10 -

IB11 -

IB12 -

IB13 -

AMSA, FLAMMABLE STORAGE : MUST COMPLY WITH DESIGN GUIDE STANDARDS AND EPA STANDARDS AS OF DATE OF CONSTRUCTION. DOORS MUST OPEN TO THE OUTSIDE OF THE BUILDING.

IB14 -

AMSA, CONTROLLED WASTE STORAGE: PROVIDE SEPERATE CONTROLLED WASTE STORAGE FOR THE AMSA.

IB15 -

IB16 -

1C1 -

WORK BAYS: Provide one double drive-through work bays. Provide overhead cranes in the drive through bay.

$(2 \text{ WORKBAYS} \times 74.3 \text{ SM (800 SF)}) + 59.5 \text{ SM (640 SF)} = 208.1 \text{ SM (2240 SF)}$

Total Work Bay area = 208.1 SM (2240 SF)

1C2 -

D Sample 5034-R (continued)

Project Number : 10317
Project Title : USAR Center/OMS/Unheat St
Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH Type 6: OMS/AMSA Collocated Shop Main and Adjacent Buildings

1C3 -

References:

- a. Memorandum, HQ USARC, AFRC-CIS-I, 22 July 1999, Subject: Information Technology (IT) Requirements for Military Construction Army Reserve.
- b. Memorandum, OCAR, DAAR-EN, 27 October 1999, Subject: Information Technology Requirements in Design and Construction.

IT services provided on-site will include:
Voice Communications (Telephone)
Logistics, and other, STAMIS Applications

Within the OMS, all IT support equipment will be rack-mounted in climate controlled facilities as IT Support Facilities. Recommended square footage for OMS Facilities are:

Network Operations Center (NOC)	14.9 SM (160 SF)
Electrical Closet	11.1 SM (120 SF)
TOTAL	26.0 SM (280 SF)

Design and construction should comply with Reference a.

1C4 -

Struc - Joint -

IIA1 -

IIB1 -

IIB2 -

IIC1 -

IID -

IIE -

IIF -

D Sample 5034-R
(continued)

Project Number : 10317
 Project Title : USAR Center/OMS/Unheat Strg
 Date : 24 Oct 2001

Functional Space Details - ACTUAL/ENGLISH

Type 7: Unheated Storage

	Authorized	Approved	Existing	Memo
I. Equipment Storage				
A. Unheated Storage	487.0	487.0	0.0	
(1) Unit/Individual Storage	442.0	442.0		IA1
(2) Staging Area	45.0	45.0		IA2
Total Unheated Storage Net Area	487.0	487.0		
Structural Allowance (10% of Net)	48.7	49.0		Struc - Un
Total Unheated Storage Gross Area	535.7	536.0	0.0	
Outgranted Area			0.0	
Total Unheated Storage Available Gross Area			0.0	
II. Supporting Facilities				
A. Privately Owned Vehicle (POV)				
(1) Parking (SY)	3010.0	3080.0		IIA1
B. Fencing (LF)	0.0	0.0		IIB
C. Lighting (EA)	0	0		IIC
D. Access Roads (SY)	301.0	308.0		IID
III. Total Square Footage for:				
	<u>Storage</u>			
A. Authorized Size	535.7			
B. Approved Size	536.0			
C. Existing Size of Alteration	0.0			
D. Size of Addition	0.0			
E. Size of New Building	536.0			

Appendix E

Kitchen Plan and Equipment List

E.1 Plan

E.1.1 A standard AR kitchen plan from the MDS files is shown below. This plan and its associated equipment have been approved by the Using Service for inclusion in all AR training center projects with kitchens. Equipment changes are occasionally made which affect all future projects. See the MDS homepage, <http://bc.cecer.army.mil/mds> for AR kitchen updates.

E.1.2 The designer is strongly advised to obtain a copy of the current standard kitchen drawings from the MDS homepage, along with current equipment data sheets.

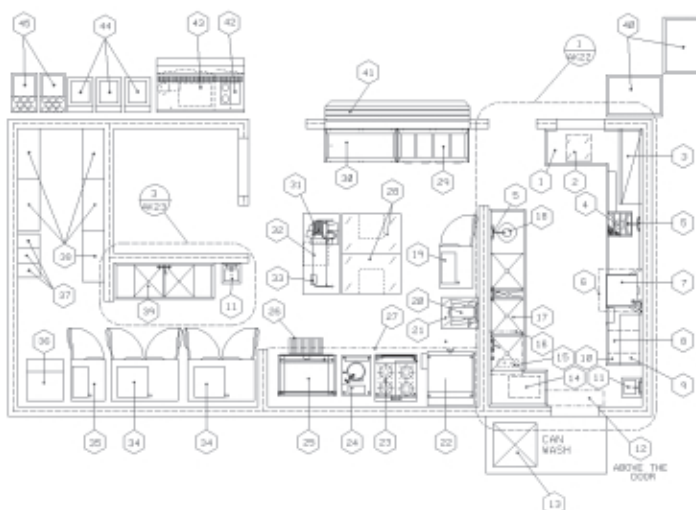


Figure E-1 Kitchen Equipment Plan

E.2 Equipment List

E.2.1 Equipment List

- 1 Soiled dish table
- 2 Silver soak table
- 3 Overhead rack shelf
- 4 Garbage disposer
- 5 Pre-rinse spray assembly
- 6 Ventilation hood
- 7 Dishwasher
- 8 Booster heater
- 9 Overhead shelf
- 10 Clean dish table

E.2 Continued

- 11 Hand sink with soap/towel dispenser
- 12 Air curtain
- 13 Can wash
- 14 Booster heater
- 15 Sanitizing booster heater
- 16 Ventilation hood
- 17 Three-compartment sink
- 18 Disposer
- 19 Warming cabinet
- 20 Mixer
- 21 Mixer stand
- 22 Convection oven
- 23 Range with oven
- 24 Tilting kettle
- 25 Braising pan
- 26 Drain trough with grate
- 27 Hood over cooking area
- 28 Mobile worktables
- 29 Hot food well
- 30 Cold food well
- 31 Slicer
- 32 Food preparation table
- 33 Can opener
- 34 Refrigerator
- 35 Freezer
- 36 Ice machine
- 37 Mobile racks
- 38 Shelving
- 39 Vegetable sink
- 40 Tray busing rack
- 41 Stainless steel tray slide
- 42 Coffeemaker
- 43 Drink stand with dolly
- 44 Cup and glass dispenser
- 45 Tray and silverware dispenser

Appendix F

Toilet Room Fixture Counts

F.1 Counts

F.1.1 The total fixture count should be based on the tables below for the maximum drill weekend; review male/female personnel ratios with Tenants.

F.1.2 As an alternative method of calculating fixtures, use 40% of the maximum drill weekend for female toilet fixtures, and 80% for males. Consider the male/female ratio within the Tenant units when determining ratio of male to female locker, toilet and shower space.

F.2 Fixture Count Tables

F.2.1 Female Toilet Fixture Counts

Peak Occupancy			Water Closets	Lavatories	Showers	Total Fixtures	Space
1	to	15	1	1	1	3	150 SF
16	to	35	2	2	1	5	175 SF
36	to	55	3	3	1	7	225 SF
58	to	60	4	3	1	8	250 SF
61	to	80	4	4	1	9	275 SF
81	to	90	5	4	1	10	300 SF
91	to	110	5	5	2	11	300 SF
111	to	125	6	5	2	13	350 SF
126	to	150	6	6	2	14	375 SF
151	to	170	7	6	2	15	400 SF
171	to	190	7	7	2	16	400 SF
191	to	215	8	7	2	17	425 SF
216	to	230	8	8	2	18	450 SF
231	to	270	9	8	3	20	475 SF
271	to	305	9	9	3	21	500 SF
306	to	310	10	10	3	23	500 SF
311	to	350	10	10	4	24	575 SF
351	to	390	11	11	4	26	600 SF
391	to	395	11	11	4	26	600 SF
396	to	430	12	12	4	28	625 SF
431	to	440	12	12	5	29	625 SF
441	to	470	13	13	5	31	675 SF
471	to	485	13	13	5	31	675 SF
486	to	510	14	14	5	33	700 SF
511	to	530	14	14	5	33	700 SF
531	to	550	15	15	5	35	750 SF
551	to	575	15	15	6	36	750 SF
576	to	590	16	16	6	38	800 SF
591	to	620	16	16	7	39	825 SF
621	to	630	17	17	7	41	875 SF
631	to	665	17	17	7	41	875 SF
666	to	670	18	18	7	43	900 SF
671	to	710	18	18	7	43	900 SF

F.2 Continued**F.2.2 Male Toilet Fixture Counts**

Peak Occupancy			Water Closets	Urinals	Lavatories	Showers	Total Fixtures	Space
1	to	35	2	1	2	1	6	200 SF
36	to	55	2	1	3	1	7	225 SF
56	to	60	3	1	3	1	8	250 SF
61	to	80	3	1	4	1	9	250 SF
81	to	90	3	2	4	1	10	300 SF
91	to	125	4	2	5	2	13	325 SF
126	to	150	4	2	6	2	14	350 SF
151	to	170	5	2	6	2	15	375 SF
171	to	190	5	2	7	2	16	400 SF
191	to	215	6	2	7	2	17	400 SF
216	to	230	6	2	8	2	19	450 SF
231	to	270	6	3	8	3	20	475 SF
271	to	305	7	3	9	3	22	500 SF
306	to	310	7	3	10	3	23	500 SF
311	to	350	8	3	10	4	25	575 SF
351	to	390	8	3	11	4	26	600 SF
391	to	395	9	4	11	4	28	625 SF
396	to	430	9	4	12	4	29	625 SF
431	to	440	10	4	12	5	31	675 SF
441	to	470	10	4	13	5	32	700 SF
471	to	485	10	5	13	5	33	700 SF
486	to	510	10	5	14	5	34	725 SF
511	to	530	11	5	14	5	35	750 SF
531	to	550	11	5	15	5	37	800 SF
551	to	575	12	5	15	6	38	800 SF
576	to	590	12	5	16	6	39	825 SF
591	to	620	12	6	16	7	40	850 SF
621	to	630	12	6	17	7	42	875 SF
631	to	665	13	6	17	7	43	900 SF
666	to	670	13	6	18	7	44	925 SF
671	to	710	14	6	18	7	45	950 SF

Appendix G

Band Room

G.1

General

G.1.1 The band room provides a practice area for a standard 44-member band and storage space for their instruments. It should be located adjacent to the assembly hall and isolated from classroom and administrative areas for acoustical reasons. See DG 1110-3-119, “Design Guide for Band Facilities” for particulars of band area design.

G.1.2 Acoustical treatment to the walls and ceiling of rehearsal and practice rooms should be provided to attain an STC of 55. The walls should extend to the roof deck or floor above and be sealed. Consider CMU walls with sand fill or grouted cores. Along one long wall of the rehearsal rooms, provide a double, movable acoustical curtain for sound absorption.



Figure G-1 Standard Band Room Plan

G.1.3 The standard space authorization is 307 sq m (3,300 sf), and the standard individual room authorizations are below; verify specific project authorized areas with project documents.

G.1.3.1 There may be offices in the band area, but they will be authorized under the administrative functions, and if located in the band area, will increase its size.

G.1.3.2 Three practice rooms 6.5 sq m each (70 sf)

G.1.3.3 Instrument storage room 37 sq m (400 sf); may be collocated with instrument/repair cleaning room 16 sq m (175 sf)

G.1 Continued

G.1.3.4 Rehearsal room 65 sq m (700 sf)

G.1.3.5 Recording room 7.5 sq m (80 sf)

G.1.3.6 Library 15 sq m (160 sf)

G.1.3.7 Main rehearsal room 146 sq m (1575 sf)

G.1.4 For the main rehearsal room provide a two-tier riser stage. The first tier should have a 200 mm (8 in) riser and a 1525 mm (5 ft) minimum tread. The second tier should have an equal riser.

G.1.5 Provide storage shelving for sheet music, catalogs, records, tapes and CDs in the library.

G.1.6 Space Design Information: Space design should be similar to that for administrative spaces. Verify specific finish, furniture, equipment, power, lighting, communications and other needs with Tenants. Tenants will furnish audio equipment, music stands, and similar items. Furniture will be part of the designer's furniture design and package.

G.1.6.1 Provide quiet air distribution to reduce ambient sound level. Design sound attenuation for ductwork between band room and adjacent spaces.

G.1.6.2 In instrument cleaning room, consider providing a large, polyethylene sink with a gooseneck faucet in a cabinet with drawers for washing band instruments.

G1.6.3 Lighting should be 50 fc.

G1.6.4 The ceiling in the rehearsal rooms should be a minimum of 3800 mm (12' - 8") AFF for acoustics.

G1.6.5 Rehearsal and practice rooms doors will be sound control doors with acoustical seals and an automatic bottom sweep.

Appendix H

Secure Compartmented Information Facility (SCIF)

H.1

General

H.1.1 This space is used for electronic intelligence training activities and operations.

H.1.2 There is no standard design for a SCIF. The project documents will provide the SCIF space authorization; the designer will need to work with the Using Service, AR Installation and Tenants to determine what specific spaces and areas are required within that authorization. They will also help define the furnishings, equipment, and mechanical/electrical/communications systems for the SCIF.

H.1.3 The governing criteria for SCIF design and construction is Director of Central Intelligence Directive (DCID) 1/21 “Manual for Physical Security Standards for Sensitive Compartmented Information Facilities (SCIF).” The manual defines several SCIF categories, and provides design and construction guidance for each. The designer will also find helpful guidance with communications security issues in two volumes from the Defense Intelligence Agency (DIA) Worldwide SCIF Security Officer (SSO) Conference – ask the SSO for the SCIF for copies.

H.1.4 The SCIF is a secure facility; access to the SCIF must be controlled and monitored, and communications within, to and from the SCIF must be secure from threat of interception.

H.2

Security Considerations

H.2.1 There will be security vestibule with CCTV monitoring, most likely with an electronic latch release. Entry into the SCIF will be controlled by the SSO or a designee. If necessary, a separate exit (or exits if two are required) can be provided to satisfy life safety/exiting requirements. The AR security personnel will want any such exits to include an audible alarm, and possibly a short delay, for security reasons. No hardware should be provided on the exterior side of such exit doors.

H.2.2 There are STC rating requirements, door and wall construction requirements, and requirements affecting all mechanical, electrical, and voice data penetrations of the SCIF. Penetrations are to be minimized. No HVAC ductwork not serving the SCIF can run through its ceiling space. Secure telephone instruments and fax machines are required in the SCIF.

H.2.3 Although windows are not absolutely forbidden by DCID 1/21, the Tenants typically do not want any windows. This might be an area for the

H.2 Continued

core of the building, but remember that no exit path can run through (into and then out of) a SCIF.

H.2.4 Design of the SCIF will include provision of power, conduit and cable for IDS and other security systems; those security systems will be provided and installed by the Government.

**H.3
Space
Information**

H.3.1 A typical SCIF might contain office/admin areas, a classroom, an open area with computer workstations, an electronics maintenance space, a server room, storage room, security vestibule, and electrical/telephone room.

H.3.2 Some spaces that are part of the SCIF space authorization may not be within the secure area. Some administrative spaces and the maintenance space might be better located outside of the SCIF.

H.3.3 Space Design Information: Refer to similar spaces (admin, classroom, armorer's room, etc.) and model the design of the SCIF spaces on those.

H.3.4 Include furniture and similar equipment as part of the design similar to the rest of the training center. Fax machines, safes, servers, secure files, and similar items specific to the operation of the SCIF will be provided by the Tenants.

H.3.5 The SCIF HVAC equipment should be separate from other building HVAC systems.

H.3.6 Provide clean power if Tenants do not provide UPS system, and verify grounding required for SCIF.

Appendix I

Physical Exam Wing

I.1

General

I.1.1 When authorized, medical spaces will be provided for physical exams, treatment and professional medical training. The project documents will define the authorized space and may provide additional information for the designer.

I.1.2 Locate the medical wing adjacent to dedicated office space that can be assigned to the medical unit. The medical wing will typically have its own entrance, as well as an interior access to the remainder of the building. It should be somewhat isolated from the rest of the building for reasons of patient privacy. Planning concepts should allow for privacy of patients when accessing dressing areas and toilets.

I.1.3 The medical wing layout and capabilities may vary to suit the Tenants' training and operational requirements. The designer should work with the Tenants to develop a functional layout.

I.1.4 The types of spaces that may be required are waiting rooms, dressing rooms, medical exam rooms, dental exam rooms, supply rooms, lavatories with male and female specimen toilet areas, laboratory, physical exam areas for blood pressure, EKG, X-ray, audio meter, eye exam, and height and weight measurement.

I.1.5 Special purpose training areas such as operating rooms, scrub rooms, two bed wards, sterile supply rooms and pharmacy will be provided only when justified.

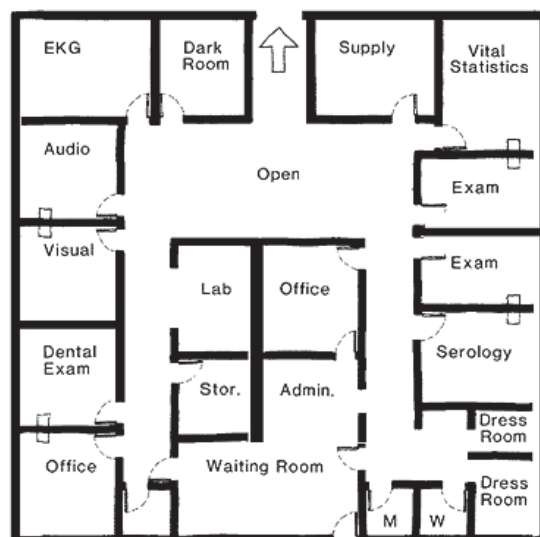


Figure I-1 Typical Medical Section Plan

I.2 Space Design Information

I.2.1 Due to the variety of functional areas possible and variance in the medical equipment, the Using Service will provide a list of equipment and proposed locations for any special requirements when the concept design is completed.

I.2.2 Refer to the space design information for office and administrative spaces in Chapter 4 as a guideline for systems, furniture, equipment, and finishes. Review recommended selections with Tenants, and obtain their input. Finishes should be those appropriate to a civilian medical clinic with attention to durability and maintainability.

I.2.3 The necessary medical equipment, standard medical equipment sets including X-ray machines, will be provided and installed by the Tenants. An X-ray equipment installation certificate will be required. Other furniture and equipment is to be addressed as for the remainder of the training center.

I.2.4 Built-in equipment may include the following:

I.2.4.1 Waiting room: Admissions counter 400 mm (15 in) wide by 1250 mm (49 in) high by 3650 mm (12 ft) long. A portion should be accessible.

I.2.4.2 Dressing room: Feed-in clothes hooks - four per dressing room. A seat may be built in on one side.

I.2.4.3 Medical exam room: Wall hung lavatory, or sink in cabinetry.

I.2.4.4 Dental exam room: Wall hung lavatory, or sink in cabinetry.

I.2.4.5 Laboratory: Base cabinets 610 mm (24 in) deep by 915 (36 in) high with chemical-resistant work counter and a two-compartment stainless steel sink. This unit will be located on one wall or as an island. The total length should not exceed 4900 mm (16 ft).

I.2.4.6 Specimen toilet: One water closet, one lavatory, one shelf, one towel dispenser and one pass-through door to the laboratory.

I.2.4.7 Dark room: Work counter 610 mm (24 in) wide by 915 mm (36 in) high by 2450 mm (96 in) long with chemical-resistant work surface. This may be located on a wall and/or an island.

I.2.4.8 Audio/meter room: One booth 915 mm (3 ft) by 1525 mm (5 ft) with sound treatment to 55 STC and one counter on one end of the room, 460 mm (18 in) wide and 715 mm (28 in) above the floor.

I.2 Continued

The Tenants may provide a portable booth in lieu of a constructed room.

I.2.4.9 Supply room: 300 mm (12 in) deep wood shelving, 5 shelves high, beginning 460 mm (18 in) from the floor, and epoxy-painted. This shelving may be installed on three walls. Shelving units may be used if cost justified. This room may also accommodate medical records in file cabinets.

I.2.4.10 Provide divided surface metal raceways above lab counters with 20A, GFI, duplex receptacles.

I.2.4.11 Other built-in or installed equipment may be included on a case-by-case basis, provided such equipment is fully justified for the operational training needs.

Appendix J

Equipment Concentration Site (ECS)

J.1

General

J.1.1 An ECS is essentially a large MEP area for the storage of military vehicles and equipment to be used during annual and weekend training periods.

J.1.2 With few exceptions, an ECS is located on an active or semi-active military installation and is collocated with an AMSA dedicated to maintaining the equipment stored at the ECS.

J.1.3 Facilities associated with the ECS will be described in the project documents, and may include parking hardstand, fuel dispensing system, loading ramp, wash platform, indoor equipment storage warehouse, combat vehicle arms vault, fencing, security lighting and an AMSA.

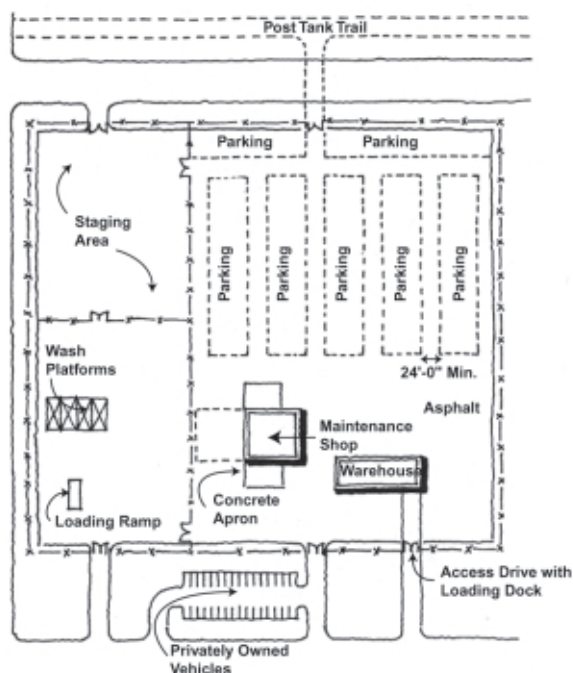


Figure J-1 Typical ECS Layout

J.2

Design Information

J.2.1 Factors which affect the layout and design of an ECS are much the same as those for the MEP at an OMS or AMSA, with the following exceptions:

J.2.1.1 Access/Egress and Circulation: Tracked combat vehicles are stored at an ECS and require access to the nearest tank trail on the military installation. In instances where asphalt paving or circulation

J.2 Continued

areas are provided around a supporting AMSA, a concrete roadway or turning area may be required to provide access for combat vehicles to the AMSA shop bays. Due to the larger size and heavier concentration of vehicles, the ECS traffic is very heavy during annual training periods. Traffic patterns, therefore, should be carefully laid out to avoid severe internal circulation conflicts at the fuel pumps, dispatch and washracks. Circulation lanes within the ECS area should be a minimum of 7.4 (24 ft) wide.

J.2.1.2 Fuel Dispensing Point: When authorized, the fuel point should be located adjacent to a primary circulation area and in proximity to the main entrance and other support facilities. The lanes and pump bases for the diesel and gas pumps should be concrete and should be drained so that all gas spills and water runoff are collected and emptied into a grease/oil separator. The separator should also serve the AMSA workbays and vehicle washrack whenever practicable. See Chapter 3 for additional environmental design guidance.

J.2.1.3 Indoor Equipment Storage Warehouse: Since the primary function of this building is bulk storage of equipment, the structure must be noncombustible and as simple as possible. Pre-engineered metal buildings are acceptable. The interior layout should be open for flexibility and provide aisles large enough for material-handling equipment. Some areas should be designed for bulk and palletized storage. Depending on the type and the amount of equipment, a loading dock may be provided at one exit. A small portion of the building serves as a work area and should have space conditioning similar to a supply office. An office for the warehouse man should also be provided. Information about the types and amount of equipment to be stored, and the types of material-handling equipment to be operated within the warehouse will be provided by the Using Service.

Appendix K

Nonstructural Standing Seam Metal Roof System for Army Reserve Projects 10/04/01

K.1

General Direction

K.1.1 At the December 2001 MILCON convention, personnel from the Using Agency, AR Installations, Design Agency, and A/E design teams met to discuss roofing for AR facilities. The following guidance represents the consensus from the meeting, and is to be used for roofing design until additional guidance is developed and issued.

K.1.2 There are three approved roofing systems for AR facilities: standing seam metal roofing systems (SSMRS), built-up roofing (BUR) systems, and membrane roofing systems (EPDM). Other systems may be acceptable with Using Service approval.

K.2

Specific Guidance

K.2.1 SSMRS

K.2.1.1 Use architectural rather than structural SSMRS

K.2.1.2 Minimum slope should be 3 in12

K.2.1.3 Require #30 felt underlayment for entire roof, and use ice and water shield in eaves, valleys, hips and ridges

K.2.1.4 Require ice and water shield over entire roof where appropriate for the locality of the project

K2.1.5 Specify and show on the drawings a rigid underlayment.

K.2.1.6 The clip screws should go down through the underlayment and insulation into the metal deck

K.2.1.7 Require crimping machine to be calibrated daily

K.2.1.8 Provide generic NRCA details to help define the quality of the roof.

K.2 Continued**K.2.2 BUR**

K.2.2.1 Use a modified bitumen 2-ply system

K.2.2.2 Require a 20 year, no-dollar-limit warranty

K.2.2.3 Provide generic NRCA details to help define the quality of the roof.

K.2.3 EPDM

K.2.3.1 Specify a minimum 60-mil thickness

K.2.3.2 Must be fully adhered, rather than ballasted or mechanically attached

K.2.3.3 Do not use over kitchens

K.2.3.4 Should include a coating to save energy

K.2.3.5 Require Factory Mutual certification for the system

K.2.3.6 Provide generic NRCA details to help define the quality of the roof.

K.2.4 Requirements for all systems

K.2.4.1 Contractor qualifications: five years minimum in the roofing business, and must be a member of professional roofing association (SMACNA and/or NRCA) for a minimum of 3 years

K.2.4.2 Required pre-installation activities

K.2.4.2.1 Must have a pre-roofing-construction meeting with the designer, supplier, manufacturer and contractor after award of the construction contract

K.2.4.2.2 Must have a pre-installation meeting 2 weeks before starting installation

K.2.4.3 Required quality control measures

K.2.4.3.1 Manufacturer's representative must be on site during installation (all week the first week, at least once a week after that, minimum based on AE's recommendation)

K.2 Continued

K.2.4.3.2 Manufacturer's representative must be an employee of the manufacturer with a minimum of 5 years experience with the type of system being installed or an employee of an independent installer certified by the manufacturer

K.2.4.3.3 Submittals will be for Government approval, and must be reviewed by the designer of record

K.2.4.3.4 Manufacturer and Installer must provide a written statement that they have reviewed the plans and specifications, and will provide a 20 year premium warranty based on the design. (See below.)

INSTALLER'S STATEMENT ON ROOF WARRANTY

I _____, THE ROOF INSTALLER FOR THIS PROJECT, HEREBY CERTIFY THAT THE PLANS AND SPECIFICATIONS HAVE BEEN THOROUGHLY REVIEWED AND THAT THE PROPOSED ROOF WILL MEET THE DESIGN INTENT AND MANUFACTURER'S REQUIREMENTS FOR A PREMIUM WEATHERTIGHTNESS WARRANTY.

INSTALLER'S NAME

PROJECT

DATE

MANUFACTURER'S TECHNICAL REPRESENTATIVE

I _____, a technical representative employed for a minimum of five years by _____, the roofing manufacturer for this project, hereby attest that the roof installed for this project by _____ was constructed and assembled in accordance with the manufacturer's approved methods and details and meets the manufacturer's premium 20 year weathertightness warranty requirements.

INSTALLER

PROJECT

DATE

Appendix L

Sample Projects and Photography Credits

L.1

Sample Projects

L1.1 The following pages provide illustrations of Army Reserve projects as examples for project designers.

L.2

Photography Credits

L2.1 The project photographs in this Appendix and throughout the Design Guide are provided with the permission of the photographers or owners of the photographs:

USARC/OMS/AMSA/WHs, Arden Hills, MN - RSP Architects

USARC, Fort Dodge, IA - Philip Prowse Photography,
Minneapolis, MN

Battle Projection Center, Arlington Heights, IL - Staff of RSP
Architects

ARRTC VOQ/Dormitory, Fort McCoy, WI - Staff of RSP
Architects

USARC/OMS/WHs, Sacramento, CA - George Heinrich
Photography, Minneapolis, MN

USARC, Parks RFTA, Dublin, CA - George Heinrich
Photography, Minneapolis, MN

USARC, Toledo, OH - Gossen Livingston Associates, Inc.

USARC, Fort Des Moines, IA - Gossen Livingston Associates,
Inc.

USARC/AMSA, Pittsburgh, PA - Blackman & Bell, Pittsburgh, PA

USARC/OMS/AMSA, Fort Belvoir, VA - Staff of Louisville
District Corps of Engineers

L2.2 The rendered drawings are provided with the with the permission of the project designers.

Add/Alt AFRC/OMS/Storage; Orlando, Florida



- Armed Forces Reserve Center (new) - 121,000 sf
- Remodel Existing USARC - 22,000 sf
- OMS (new) - 8,600 sf
- Add Mezz to Existing Storage - 16,000 sf
- 40 Acres
- Design completion - June 2001
- Construction completion - Winter 2003

R S P A R C H I T E C T S

USARC/OMS/DS-GS/WH; Arden Hills, Minnesota



- USARC - 53,000 sf
- OMS/DS-GS - 31,000 sf
- Warehouse - 58,000 sf
- 29 Acres
- Design completion - June 1989
- Construction completion - September 1991

R S P A R C H I T E C T S

USARC; Fort Dodge, Iowa



- USARC - 11,500 sf
- 4 Acres
- Design completion - May 1996
- Construction completion - October 1997

R S P A R C H I T E C T S

Berry Rosenblatt USAFC/OMS; West Hartford, Connecticut



THE MASON & HANGER GROUP, INC.

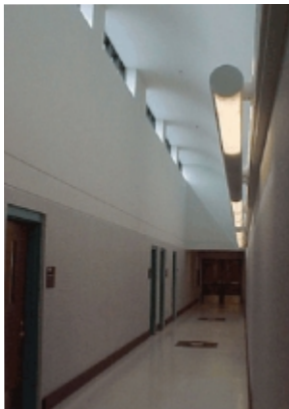
USAR Battle Projection Center; Arlington Heights, Illinois



- BPC - 28,000 sf
- 6 Acres
- Design completion - 1996
- Construction completion - 1998

R S P A R C H I T E C T S

USARC/OMS/AMSA; Ft. Belvoir, Virginia



- USARC - 47,000 sf
- 13 Acres
- Design completion - January 1999
- Construction completion - September 2001

STAR TEAM - Corps of Engineers, Louisville District

USARC/AMSA; Pittsburgh, Pennsylvania



- USARC - 136,300 sf
- OMS/AMSA - 15,740 sf
- Unheated Storage - 2,540 sf
- 35 Acres
- Design completion - January 2000
- Construction completion - September 2001

Final Design - GOSSEN LIVINGSTON ASSOCIATES, INC.

Concept Design - R S P A R C H I T E C T S

USARC; Des Moines, Iowa



- USARC - 53,400 sf
- DEPMEDS Storage - 15,500 sf
- 20 Acres
- Design completion - September 1992
- Construction completion - October 1994

GOSSEN LIVINGSTON ASSOCIATES, INC.

USARC/OMS; Toledo, Ohio



- USARC - 43,000 sf
- OMS/AMSA - 31,100 sf
- 23.5 Acres
- Design completion - July 1994
- Construction completion - August 1996

GOSSEN LIVINGSTON ASSOCIATES, INC.

USARC/OMS/UHS; Lincoln, Nebraska



- USARC - 46,300 sf
- OMS - 6,200 sf
- UHS - 2,300 sf
- 10 Acres
- Design completion - August 2002
- Construction completion - September 2004

R S P A R C H I T E C T S

USARC/DCMC; Arlington Heights, Illinois



- USARC/DCMC - 96,300 sf
- 8 Acres
- Design completion - November 2000
- Construction completion - October 2002

R S P A R C H I T E C T S

USARC/OMS/WHs; Sacramento, California



- USARC - 64,200 sf (2 buildings)
- OMS - 11,600 sf
- WHS - 42,115 sf
- 36 Acres
- Design completion - 1997
- Construction completion - November 1999

R S P A R C H I T E C T S

USARC; Parks RFTA, Dublin, California



- USARC - 56,000 sf
- 8 Acres
- Design completion - 1998
- Construction completion - March 2000

R S P A R C H I T E C T S

USARC/OMS/WHs; Salt Lake City, Utah



- USARC - 31,400 sf
- OMS - 6,640 sf
- WHS - 7,500 sf
- 10 Acres
- Design completion - 1998
- Construction completion - September 2000

R S P A R C H I T E C T S

Add/Alt USARC/OMS/ECS; Fort Polk, Louisiana



- USARC - 12,325 sf
- OMS - 11,700 sf
- AMSA - 15,500 sf
- ECS WHS - 53,225 sf
- 50 Acres
- Design completion - December 2000
- Construction completion - November 2002

R S P A R C H I T E C T S

AFRC/OMS/AMSA/UHS; Greenville, North Carolina



- AFRC - 78,000 sf
- OMS/AMSA -14,200 sf
- UHS - 2,000 sf
- 25 Acres
- Design completion - July 2001
- Construction completion - November 2002

R S P A R C H I T E C T S

ARRTC VOQ/Dormitory; Fort McCoy, Wisconsin



- VOQ/Dormitory - 105,000 sf
- 10 Acres
- Design completion - 1998
- Construction completion - December 2000

R S P A R C H I T E C T S

USARC/OMS/Storage; Mesa, Arizona



- USARC - 48,530 sf
- OMS - 5,535 sf
- Storage - 16,300 sf
- 10 Acres
- Design completion - May 2002
- Construction completion - June 2004

R S P A R C H I T E C T S